COAL AGE

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"It's a pudding will put a man in good humor with everything, except the two bottom buttons of his waistcoat," wrote Charles Dickens, in one of his Christmas stories, a half century ago.

A pudding, good humor and a full stomach! surely that's Christmas!

Dickens undoubtedly stands supreme, when it comes to making us *feel* Christmas. Other writers may tell us about "Peace on Earth, Good Will toward Men," but he gives us the actual sensation of Yuletide. We have just reread his "Christmas Carol," and when we finished that last line—"And so, as Tiny Tim observed, God bless Us, Every One;" we closed the book, realizing, as we had never realized before, the power and the goodness of his genius.

And now this thought comes to us. Suppose that every child in every mining camp in America could have that story read to him on Christmas Eve, while the spirit of the occasion is everywhere. Wouldn't the effect on the next generation of miners be beneficial?

Of course, to accomplish this, some of us would have to make sacrifices; many would have to forego Christmas family reunions planned in distant cities, others would have to create funds to buy books, or be willing to participate in public readings, and, mind you, the money required for the books would be but a drop in the bucket, for once the Christmas spirit gets loose in the land, Turkey and Plum Puddings in great plenty would have to be forthcoming from somewhere.

We doubt if any fellow who postponed the family reunion would have cause for regret. On Christmas, our mining camps need all of those inhabitants who have sentiment enough to enjoy family reunions, and if only enough of such men would realize that their mining camp could be a big family circle, the reputation of such communities might touch par.

The town, the village or the city that furnishes its children with Plum Pudding and Christmas Cheer will not be forgotten, when those children are grown to man's estate and are planning homes for their own descendants. In fact, Plum Pudding and Good Cheer might be distributed to good advantage by even the most selfish; such generosity in the end would only be "good business."

Now we have had our say, but we couldn't close with the words "good business." We prefer to turn back to Dickens: "And so, as Tiny Tim observed, God bless Us, Every One."

Efficiency in Coal Mining

By Harrington Emerson*

SYNOPSIS—Address before the Coal-Mining Institute of America. Simple and explicit rules and suggestions are given for the buying, the equipment and the operation of coal mines.

Mathematics is a science. Different businesses use it in different ways. Chemistry is a science. Different businesses use it in different ways. Hygiene is a science. Different people use it in different ways. Efficiency is a science. It is the science of realizing standards. Different businesses have different standards and different men have different standards for the same business.

We cannot talk of efficiency in coal mining without first setting up standards. As the special cases are usually more interesting than abstract reasonings, I shall give the standards that we established for a particular coal mine in a particular locality. I do not claim that these standards would have applied to any other mine.

Capital Invested

As to capital there are four general rules, one or the other or all of which are frequently violated:

(1) Know what all the facts are. Do not delude yourself with fancies or guesses.

(2) Do not pay more for any property or improvement than you can get back out of it, including 6 per cent. interest, in 8 to 10 years. Do not pay more than $1000 for a property that will not yield a net profit of $150 to $200 a year.

(3) Do not spend $1000 for an income of $200 until you are sure you have no opportunity to spend $200 or less to save $1000.

(4) Do not allow your capital to shrink. Carry as an operating expense any diminution.

Coal properties as to capital investment come in the same catagory as real estate; unless the property is made productive the interest and taxes accumulate faster than any possible increase in value. A lot in New York at the corner of Broadway and Wall St. sold about ten years ago for $1,000,000. Even at this price it would not have been a profitable investment in 1800 at $1000, unless it had brought in current revenue. The great land grants to the railroads would have swamped them if for the first 20 years taxes had been levied at $0.10 an acre a year. The taxes would have amounted to $5,000,000 yearly for the Northern Pacific alone.

Coal and lumber properties have to be worked. The revenues must come from the coal mined and the trees felled. It is an extremely ticklish business in real estate, in coal lands, in timber tracts to put the dead certainty of taxes and interest against the guessed-at rise in value.

Therefore, in considering timber tracts and coal fields, always insist on a separation of land investments from operating investments. My second rule applies to both tract and operating investments.

The third rule is often violated, frequently because the first rule about knowing the facts is violated. Don't invest $5000 to earn $1000 if you can earn $1000 by investing $200.

*Efficiency Engineer, 30 Church St., New York.

Labor Rules

It is not what you pay labor, it is the profit it yields you that counts.

It is a general law applying not only to labor but also to equipment and to materials that the best grades are relatively cheaper than poor grades. You know that this applies to coal.

Mr. Mellen, former president of the New York, New Haven & Hartford, is quoted recently as saying that no railroad official is worth more than $25,000 a year. He said that he would have worked just as hard for $25,000 as he worked for $75,000. This may be true. Caruso may sing just as well at a charity concert as in grand opera for $5000 a night. It does not follow, however, that you could get Caruso for $50 a night. The right president for the New Haven would have been cheap at a million dollars a year, if he could not have been secured for less.

The one efficiency rule as to labor is to determine what you can afford to pay and then put in your time and your skill and your energy finding the best men that your permitted pay can buy.

In coal mining you have the scale. You are prevented from going below a certain amount. I have never seen a coal mine yet in which money was spent to best advantage for labor.

This is so tremendously important a subject that I wish I could dwell upon it. Take it from me that your descendants 100 years from now will have learned to handle labor in the way you ought to be able to handle it today. A strike seems to me not only a preventable thing but a ridiculous, a stupid thing like the sinking of the Titanic or the wrecks on the New York, New Haven & Hartford Railroad.

In these two rules: (1) Handle your capital economically; (2) handle labor economically, is laid down the basis for efficient coal mining.

How to handle capital and labor efficiently is the chief business of the great executive. There are many principles, not rules or devices, that will guide him, and without these principles he cannot succeed. Some great geniuses know the rules instinctively. The rest of us poor mortals have to learn them. Some boys learn to swim by themselves, most of us are taught to swim. But unless we know how to swim we shall surely drown if we fall overboard even if we are not 20 ft. from shore.

Some of the principles for efficient direction are:

Definite ideals, definite authority and responsibility, constantly available and used competent counsel, strict discipline, fair dealing, high and immediate efficiency reward.

The main principles for efficient supervision are that every part of material, of equipment, of personal work shall be designed, specified, selected, tested, conserved and inspected with continuous intelligent care.

The main principles of successful management are that there shall be balance between the three great human incentives—action, appetite and inspiration.

The main principles of successful operation are:

(1) Standardized conditions; (2) standardized operations; (3) advance planning; (4) standards and sched-

ules; (5) dispatching of all work; (6) standard practice instructions; (7) records, reliable, immediate, available, classified and adequate.

As to Particulars

A few years ago I was one of a committee which made the following report on a coal mine in a receiver's hands:

"If the coal properties are shut down, the annual loss will be $420,000.

"If they are operated at the standardized cost per ton of $0.857 and for an output of 3,000,000 tons and the coal is sold at the price realized last year, $0.8097, the loss will be $141,900.

"The standard cost includes a charge for interest of $0.067 and for depreciation of $0.058, a total of $0.125 per ton.

"The standard costs are 14.8 per cent. lower than 1909-10 corresponding costs, 17.4 per cent. lower than July and August, 1910, corresponding costs."

This short report was amplified into the following:

Our Findings

(1) The coal lands have been injudiciously acquired.

(2) Money has been injudiciously spent in equipping the plants.

(3) Overhead charges for interest, maintenance and depreciation are therefore high.

(4) The present market selling price for coal is so low as to make profitable coal mining difficult, if not impossible, even if the coal lands had been secured without price, and had been equipped with rigid reference to economical operation.

(5) The present situation would be most effectively bettered if the market price of coal increased.

(6) To shut down the mines and wait for better prices would entail an annual expense for power, maintenance, supervision, depreciation and interest of $420,000.

This does not include an annual charge of $104,494 on book value of coal lands not immediately identified with the plants to be operated.

(7) The cost of mining coal if operations are standardized, will be $0.857 per ton for a daily output of 12,000 tons, a monthly output of 250,000 tons and a yearly output of 3,000,000 tons.

(8) The loss from continued operation will depend on the price obtained for coal sold:

At $0.66 loss will amount to	$561,000
At $0.70 loss will amount to	420,000
At $0.70 loss from operations and loss from suspension of operations will be equal.	
At $0.79 loss will amount to	200,000
At $0.8097, price netted by coal sales in 1909-10, loss from operation will be	141,900
At $0.857 there is neither loss nor profit from operation.	
At $0.921, profit above operation. This is sufficient to pay interest on obligation. Coal should therefore continue to be mined.	192,000
At $0.948, profit from operation. This pays for operation, for moneys owed and for present administration charges.	272,000

(9) While waiting, hoping and working for better coal prices, costs of operations are to be standardized;

(a) By revaluing all the lands and equipment, thus reducing future operating overhead charges;

(b) By putting the management of inside and outside operations in the hands of a competent and experienced man of reliable character;

(c) By giving him all the assistance possible from modern business organization and methods adapted from other bituminous coal-mine operations and industrial enterprises;

(d) By concentrating operation at that plant, or those plants, where coal can be mined most cheaply;

(e) By investigating the advantages, if any, to be derived from coking the product of these mines;

(f) By investigating the advantages, if any, of establishing a washery at the mines.

Standards and Standard Table of Costs

In making its investigations your committee attempted to determine a standard cost per ton of mined coal for a standard output, which we assumed at 3,000,000 tons each year.

The standards adopted for immediate use are:

(1) The present standard mining scale for mining labor, $0.485.

(2) Current rates of wages for a minimum amount of other efficient working labor, $0.175.

(3) Moneys for supervision, supplies and other bills, taxes, insurance, etc.; an efficient minimum, $0.07.

(4) Depreciation charges based on revaluations, on experience, and on the present ascertained coal reserve tributary to operating plants, $0.06.

(5) Interest at 6 per cent. per annum on reappraised values of coal reserves, mining buildings, equipment, etc., actually used for mining operations, $0.067.

The company has other expenses not standard and not directly appertaining to mining operations. These expenses are:

(6) Interest and other charges on investments at present inoperative, $0.029.

(7) Excessive interest load, due partly to investment in elaborate and unnecessary plants, partly to deficits accumulated from former years, and partly to other causes, $0.035.

(8) High costs of administration of the Company's business.

COSTS FOR 1910

Operation	$77,294	
Maintenance	14,156	
General expense, excluding insurance	37,912	
	$129,362	
Less allowance for mining operation	48,000	
	$81,362	
Cost per ton		$0.0271

The output of coal can fluctuate from no tonnage, if the mines are closed, to a maximum daily tonnage of 17,000 tons.

If this maximum of 17,000 tons daily could be attained it would reduce mining costs about as follows:

OUTPUT PER YEAR, 4,250,000 TONS

	Costs per Ton
Mining labor	$0.455
Other labor	0.15
Operation	0.06
Depreciation	0.06
Interest	0.045
Total	$0.77

TABLE ON BASIS OF 3,000,000 TONS ANNUALLY
Daily Output, 12,000 tons

			Costs per Ton
1.	Mining labor	$0.485	
2.	Other labor	0.175	
3.	Total working pay-roll (1 and 2)		$0.66
4.	Operations	$0.07	
5.	Depreciation	0.06	
6.	Interest	0.067	
7.	Total overhead charge (4, 5, 6)		$0.197
8.	**Total standard cost per ton of coal (3 and 7)**		$0.857

The whole practical problem is to attain the standard costs, and it is this aspect of the situation which underlies our report.

Because the future is more important than the past, we have established standard costs for operation for the next year.

Having set up standards of cost for carrying output and having established current efficiencies we are able each month to show the exact losses due to inefficiencies and their cause.

We do not say vaguely, "You ought to mine for $0.10 a ton less." We subdivide the $0.10 above standard into perhaps 50 different items and point out not only the amount of, but also the cause of the excess or unstandardized cost in each."

If you know where and when and why losses occur, it is usually possible to prevent them.

The science of efficiency is applied to any business in a similar manner.

It is possible to have a great deal of system without any efficiency. It is possible to have great strenuousness without any efficiency. It is possible to have a minimum of system, a minimum of strenuousness, yet great efficiency.

Industrial Safety

By Herbert M. Wilson*

SYNOPSIS—Some of the developments in the industrial-safety movement are here enumerated. Figures are also given, showing the decrease in coal-mining accidents during recent years.

The mining industry may point with pride to the fact that long before safety was considered in other industrial occupations, state legislation had been enacted making provision for mine inspection, and much has been done in the succeeding years to safeguard the workers, not only through the various state mine departments, but also through the private inspection maintained by the operators.

Up to a few years ago, the too oft-recurring mine explosions, with the long lists of dead and injured, and the reports of the daily accidents from minor causes, were accepted as inevitable to the industry. It was at this period that the impetus furnished by the first Conservation Congress and a series of coincident mine explosions awakened Congress to the necessity of investigating these disasters.

The propaganda which led to the creation of the Federal Bureau of Mines and the publicity created by its method of operation has in the interval aroused the mining community to a realization of the lack of safety and has given a quickened impulse for better conditions in every other industrial occupation.

It is a fact worthy of just pride, therefore, that not only has this industry led in state and in individual concern for the safety of its employees, but also it is the first—unless transportation be called an industry—to receive federal aid and encouragement. It should be a matter of still greater pride that the activity for safety in mining has pointed the need and the way for the guidance of the other industries.

Two New Societies Are Organized

Due perhaps in some measure to these causes, and in larger sense to the agitation for the enactment of workmen's compensation laws, and further in large degree to the activity everywhere evidenced for greater consideration of our fellow-beings, as voiced in Christ's commandment, "Love thy neighbor as thyself," last year witnessed the organization of at least two national societies concerned in furthering the safety movement.

First among these is the American Mine Safety Association, conceived in this city and now entering upon its first year. Its membership includes mine operators, mine inspectors, mine workers and physicians. It aims to secure as a member every man concerned in mining coal or ore. The good results from this organization are already evidenced in the more frequent field meets of miners, both for contests in and instruction regarding safety, the establishment of local branches of the association, a national mine-rescue corps, and a national first-aid corps.

At almost the same time there was conceived in Chicago the National Council for Industrial Safety, numbering in its membership the leaders in every industrial branch—railroads, manufactures, iron and steel, etc. This council will strive to coördinate the efforts of kindred organizations as a medium for exchange of information relative to those safety measures which may be applicable to the several industries.

The steel industry has perhaps pushed farther the introduction of safety appliances and safeguards around machinery, the organization of safety committees, and the awarding of prizes, than any other of the industries, while the manufacturing corporations—the National Cash Register Co., our own "57 Varieties" and their fellows—are spending hundreds of thousands of dollars in advancing the safety and welfare of their employees.

Meetings and Exhibitions in New York

The American Museum of Safety in New York held in the month of October its first annual exhibition of safety appliances in the Grand Central Palace. This exhibition was worthy of a long journey if only as an object lesson in the tremendous amount of energy and money being expended in every industry for the adoption of safeguards to human life. And next week there will be held in the same building a National Safety and Sanitation Conference.

Have you scanned the latest statistics of mine accidents? If so, have you noted that in the United States in the year 1911 there were 2719 persons killed in coal mines and 695 in metal mines; that there were 9106 seriously and 22,228 slightly injured in coal mines, and 4169 seriously and 22,408 slightly injured in metal mines,

*Engineer-in-charge, Bureau of Mines, Pittsburgh, Penn.

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while in all 61,325 mine workers were incapacitated for one day or over?

Humiliating as is the apparent indictment against the mining industry, conveyed in the above figures, yet they do not tell the whole story. There is comfort in the fact that in the last quarter-century, while there has been a constantly increasing ratio of men killed in the mines per thousand employed, or per million short tons of coal produced, the high-water mark was reached in 1907. In that year the death rate in the coal-mining industry alone was 4.88 per thousand men employed, or 6.93 per million short tons of coal mined.

During the last five years, up to and including 1912, there has been a constant and gratifying diminution in the death and accident rate, the number killed in 1912 being 3.27 per one thousand men employed, or 4.42 per million short tons of coal mined. No other industry can point to so splendid a record of safety work accomplished.

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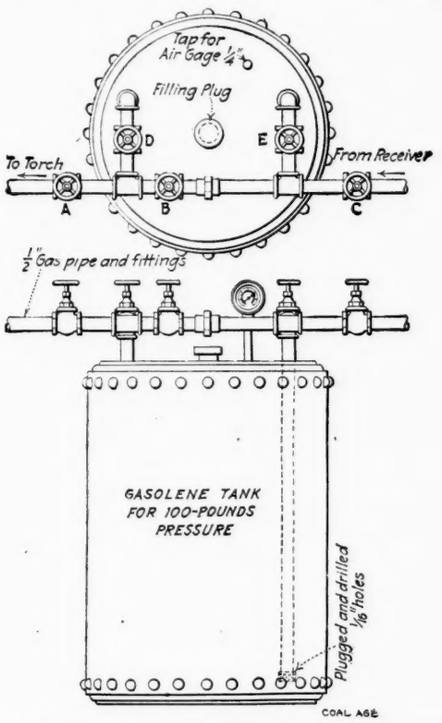
Removing Steel Tires from Mine-Motor Wheels

When tires must be removed from the ordinary mine locomotive, the usual custom is to heap coals of fire over the entire wheel until the desired degree of heat is obtained, then remove the wheel, cool the central portion, or all parts but the tire, then pull the latter off. This process is both slow and expensive, and frequently results



THE GASOLINE TANK AND ITS CONNECTIONS

in breakage of the cast portion of the wheel, since the spokes cool much more rapidly than either hub or rim.

While superintendent at the Tennessee State Coal Mine, the writer installed the apparatus here described to facilitate the removal of tires.

A Westinghouse locomotive air compressor was purchased and bolted to two 6x12-in. upright posts, located in the boiler house. This machine required but little space, being only 30 in. high, and 14 in. wide. An old boiler 30 in. in diameter and 7 ft. high was used as an air receiver, and connected by 1½-in. pipe to the compressor. A suitable air-pressure gage and safety valve were provided and installed upon this improvised receiver.

The air was conducted to the mine a distance of about 1200 ft. by 1-in. wrought-iron pipe. This was connected to a gasoline tank as shown in the accompanying drawing.

A torch was then made by bending a ½-in. pipe in a circle, the internal diameter of which was about 2 in. larger than the outside diameters of the tires to be handled. The ends of this circular pipe were then connected by means of a tee, provided with right- and left-hand threads on the run. Into the outlet of the tee a piece of pipe, about 5 ft. long, was screwed, this connected to a hose which in turn was joined to the gasoline tank.

The inner side of the circular torch was drilled with $\frac{1}{32}$-in. holes spaced 1½-in. centers. In order to keep the blast uniform, however, those holes which were located diametrically opposite the tee were drilled slightly larger than $\frac{1}{32}$ inch.

The method of operation was as follows:

The gasoline tank was placed at least 40 ft. from the locomotive wheel, and connected upon the inlet side to the air line from the main air receiver. The highly inflammable gasoline is thus removed 40 ft. from the flames. The discharge pipe is then connected to the torch. After all pipe fittings and connections have been made, the receiver is filled with as much gasoline as is necessary to do the work, ordinarily about three gallons. After this is done, the compressor is started and valves marked *C* and *E* are opened, until a pressure of between 35 and 40 lb. is registered by the pressure gage attached to the gasoline tank. Valve *E* is then almost entirely closed, being left but slightly open. Valve *A* is then opened fully, and valve *B* slightly opened. Valves *A* and *D* are then so adjusted that a mixture of air and gasoline is caused to flow through the pipe to the torch. This adjustment should be such as to secure a continuous blue flame.

The air used in the gasoline tank should be as dry as possible in order to keep water out of the fuel. Filling the reservoir about two-thirds full of excelsior will help to remove moisture from the air and adds materially to the work of the same.

In shutting down the apparatus in order to prevent a back suction, which is liable to blow up the reservoir, valve *A* should first be entirely closed. Valve *C* is placed in the line so that connection can be cut from the main receiver in case of trouble at that point. After the torch is burning properly, it only requires a few minutes' heating before the tire is ready to remove. Generally speaking, 40 or 50 tons is sufficient to take off a tire. This method, therefore, which is comparatively inexpensive to install, is much more efficient in every way than that of the old open fire.

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A German method of reducing coal dust at working faces is to force water by means of high pressure into the coal through drill holes, thus wetting the coal, which reduces the amount of dust produced. It also helps to bring down the coal. This method gives best results in longwall mining, but can also be used in wide rooms

Selection of Coke Samples for Analyses

By Fred C. Keighley*

SYNOPSIS—Most of the phosphorus trouble that occurs in the manufacture of coke can be avoided if proper methods of sampling are followed. Several instances are cited from practical experience.

The sampling and analysis of coke have always been a source of much annoyance and uncertainty to the coke manufacturers and I imagine to the iron smelter as well; in fact, it has often been the cause of much bad feeling between the manufacturer of coke and the consumer of the same, not to mention the proneness to profanity of the parties involved in the controversies arising from the amazing seeming impossibility of getting two sets of analyses to be on terms of equality with each other.

To the average coke maker it seems to be the height of absurdity and unreasonableness on the part of the iron smelter to turn down said coke maker's coke on account of one- or two-thousandths of 1 per cent. of phosphorus, when said coke was first class in every other respect and acknowledged to be so by the iron smelter. The coke maker would say, "But the chemist gets different results and the one-hundredth part of a gnat's heel that you are kicking about does not exist," and so the arguments pro and con can proceed *ad infinitum*, much to the disgust of the participants.

I have been connected with coking coal and coke manufacturing operations in one capacity and another for over 30 years, and nothing ever caused a sinking of my heart and the changing of my complexion as much as that term phosphorus when it appeared in my morning's mail. It is a fact that I once lost a good position by reason of a difference of opinion as to the cause of the phosphorus barometer or constituent taking a trip of a couple of one-thousandths of 1 per cent. in altitude.

How I Lost My Job

My superior officer said one day: "The phosphorus in your coke is positively abominable," and I heartily agreed with him, but when he further remarked that I was the cause of such misbehavior on the part of the coke that I was producing, my temperature went up in an alarming degree and the atmosphere in that neighborhood immediately assumed a bluish aspect that smacked more of sulphur fumes than phosphorus. We stormed at one another by mail and the upshot of that correspondence was that I suggested that he take his coke works to a certain very warm climate, but he decided that it was a much simpler proposition to induce me to seek a cooler place which I did with great promptness.

The facts in the case were that the plant I had charge of at the particular time referred to had in its youth discreetly managed to keep a little shy of 0.02. Then it suddenly got to flirting with 0.022, with a further occasional looping-the-loop with the naughty shades of 0.03.

The figure 0.02 is the upper limit of decorum in bessemer coke etiquette, and flirting with fractions of thousandths of 1 per cent. above that is simply scandalous in a high degree. At the time I refer to, the superintendent of a coke works did not know what the constituents of the coal he daily produced were. All he knew was that the resulting coke had a good behavior record, an indifferent one or a vile one, as the case might be. Such a thing as sampling coke and coal regularly was considered a piece of extravagance not to be tolerated for one moment. The iron smelter was the fellow to cut such capers as that and even he only did it when his furnace got the stomach trouble and the gastric juices were unfavorable for the delivery of the correct thing at the hearth of the furnace.

Phosphorus Was Due to a Fault

To make a long story short, it was discovered some months after my leaving the works in question, that a very large fault crossed the coal field operated on and the high phosphorus contents of the coal were in some way due to the near presence of that fault. Many of us have more or less phosphorus troubles even now, in spite of the better facilities afforded to the coke manufacturers to ascertain the chemical constituents of not only the coke, but the coal. With large coke producers it is now customary to have a chemist to look after troubles of this kind and thus assist the management in keeping tab on that very mysterious element, phosphorus.

No chemist, no matter how skillful he may be, or how great his experience might have been, can lay his finger on phosphorus, and tell you where it came from and what to do with it; however, he does know where it invariably goes when it gets associated with the contents of a blast furnace. There is as yet no known way of reducing or driving off phoshorus in either the coal or the coke and about the only thing that can be done is to sample both coal and coke regularly and carefully and have the same analyzed as regularly and carefully by a competent chemist. This, as before stated, is the practice of uptodate coke-makers, and the same will apply equally to the iron-smelting management.

There will be a difference between the findings of the different chemists of given samples, but with care the phosphorus determination should not be more than one- to three-thousandths per cent. apart. After much thinking, some trying experiences and just a little "cussing," I have about come to the conclusion that where the chemists are so far apart in their determinations of the phosphorus constituent of the coke or coal as the case may be, that in all probability the method of sampling and the preparation of the same have a great deal to do with the difficulty referred to.

A short time ago my attention was called to the fact that a certain heretofore low-phosphorus coke was changing its complexion. I could not believe this at first, but as you no doubt know, these chemists have such a persuasive way about them that I was compelled to sit up and take notice. Remembering my experience in the past as cited to you in the other paragraphs of this paper, I advised the parties interested to go after the coal, and the result was that in a certain section of the mine where the pillars were being taken out, the coal upon analyses ran up to 0.077 in phosphorus, which would be equiva-

*General superintendent, Oliver & Snyder Steel Co., Oliver, Penn.

Note—Paper read before Coal Mining Institute of America, Pittsburgh, Penn., Dec. 4, 1913.

lent to 0.115 in coke. A short distance away from the point just named going westward the phosphorus showing was 0.040 to 0.060 in the coke equivalent. It would be as well to remember that the phosphorus showing in a given sample of coke is generally about one-half higher than that shown by the coal analysis.

Phosphorus Decreased as We Went Westward

The culprit having been caught, as it were, at the fountain head, a series of samples were taken on a westward course, and this resulted in getting results as given by the following figures. These figures stand in the order of the sampling as it proceeded westward: 0.032, 0.029, 0.021, 0.021, 0.012, 0.011, 0.011, 0.010, 0.009, 0.009, 0.008, 0.006, 0.006, 0.006, 0.005.

I have not been able to figure out just what law this diminution of the phosphorus contents in coal works under, but it certainly was a godsend to the parties to discover that the high-phosphorus coal existed only in a small portion of the mine territory, yet the results of the coke analyses were not entirely satisfactory, at least not as good as a small quantity of high-phosphorus coal output would indicate. In view of this fact the next thing to be done was to follow up the coke problem.

When this difficulty first appeared, samples were taken from the coke cars as follows: A typical piece was taken at one end of the coke car, one was taken from the middle and a third from the remaining end of the car while the same was in process of being unloaded. This, of course, meant three samples from each car and made quite a bulky pile when any considerable number of cars were sampled. The samples gotten in this way were gathered up and reduced by hand to a general sample. This did not bring the expected results. Full-length samples were then taken from every oven at three different points and again reduced to general samples. Still there was trouble.

Finally, at the suggestion of a chemist of well known ability and experience, samples were taken at several points in each oven, such points being designated on a blueprint showing a horizontal section of the whole oven, such section being divided into three concentric circles of equal area and samples taken in such number and at such points as to give a fairly accurate sampling of the whole of the output of the ovens under observation and consideration. This was the best method of all but still things did not seem to "gee" just as they should.

At this stage, it was apparent that the method of gathering up and the division of the samples for procuring a general sample of the coke was largely responsible for the difficulty, and I intimated this to said chemist. He came to my aid again and suggested that a "Chipmunk Crusher" might be a good thing to get and use in connection with the sampling of coke. Such a crusher was installed, and the results were of a most encouraging character; in fact, the crusher nearly eliminated the trouble.

In conclusion, I will say that there are still some features bobbing up occasionally that furnish food for reflection, but I believe there is not the slightest doubt that the bulk of the phosphorus trouble in question came through the poor methods of sampling and the lack of knowledge as to the best method to be adopted in that connection.

This paper is not intended to be final, but rather is written with a view to open up an intelligent discussion as to what can be laid down in the way of a method of procedure that will attain or reach the best possible practice along the lines of coke sampling and the preparation of same for the chemist's work, which is certainly of the greatest importance to both coke producers and iron smelters.

Perhaps it would be as well to state that this paper was written principally from a bessemer-coke standpoint, i.e., on coke that was intended to be used in connection with the bessemer process of refining iron. In the case of iron smelting that later on is to be refined by basic process, phosphorus is not nearly so serious a question, as that element is taken care of in the openhearth furnace; however, there is a limit to the percentage of phosphorus that can be tolerated even there.

A Portable Sheave for a Gravity Plane

One of the most interesting applications of the gravity plane is to the lowering of ore and the hoisting of empty skips in the stopes of the North Star mine, Grass Valley, Calif. It may well be recommended for use in coal mines where the rooms are steep. At the same time, where the grade is not too heavy for standard cars and where the inclination is not so steep but that a car can be fully loaded, the methods should be modified so that cars instead of being dumped at a battery may be run out onto the heading. The gold-ore vein at the North Star mine lies at 23 deg. to the horizontal. The head sheave, says L. O. Kellogg, in the *Engineering and Mining Journal*, has three pulleys, as illustrated in Figs. 1 and 2.

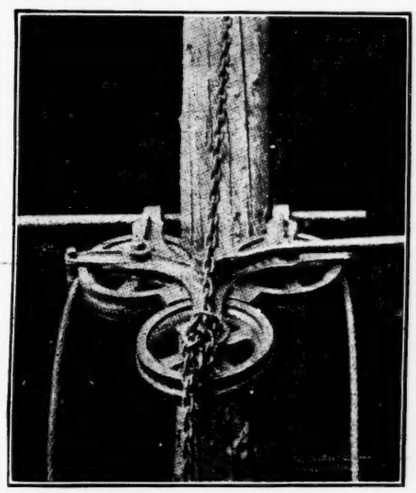

Fig. 1. Go-Devil Head Sheave in Position on Post

The rope passes up on the outside of the outer pulleys, down the inside through grooves in the brake block and around the lower edge of the third pulley. The brake block is triangular, pivots about its center in between the three pulleys and is operated by a handle attached to the square head shown. It is brought to bear on all three pulleys and thus gives a strong braking effect. Passing around all three, with a large angle of contact on each, the rope has no opportunity to slip.

The brake lever can be locked in position by extending the handle with a piece of pipe and by connecting the

end of this to a lever with a ratchet lock set on a stout post. The two halves of the triangular spider-frame, the three pulleys and the brake block make six castings entering into the device, besides the bolt, nuts and handle. The manner of suspending the block by a chain and a bolt through the post is shown in Fig. 1.

A 5/8-in. steel-wire rope is used and is attached by

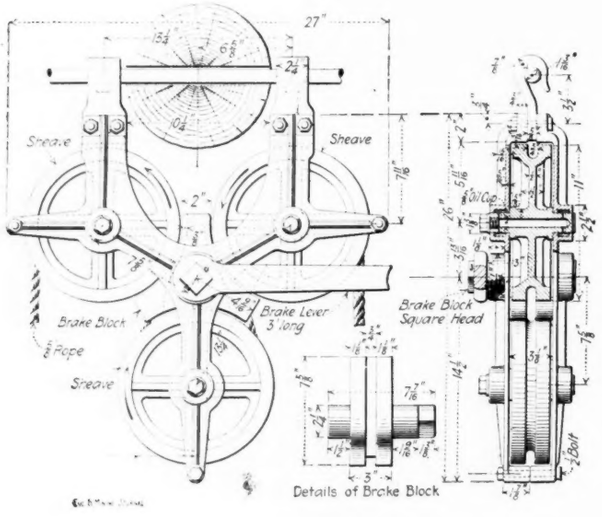

FIG. 2. TRIPLE-SHEAVE HEAD BLOCK FOR GO-DEVIL GRAVITY PLANE

means of a safety hook. As there is only one car weighing about 3000 lb. on the down grade, and, as much energy is lost in the unavoidable friction in the head block, the gravity plane or "go devil" as it is called, will not operate below a 5-deg. slope and with difficulty below a 10-deg. When a 35-deg. inclination is reached, the operation of the plane is difficult and sometimes dangerous.

Coal and the Panama Canal

Under the above caption, *The Iron and Coal Trade Review* (London, England), says editorially in its issue of Nov. 7, as follows:

News comes to hand from the United States that American coal producers and manufacturers are laying ambitious plans for the extension of their export trade in view of the imminent opening of the Panama Canal. It is stated that several companies, formed with that end in view, have now been organized and have secured depots on the Gulf, and the Central and South American coasts for the purpose not only of supplying bunkers to ships but also of sending coal inland.

We are told, too, that lines of steamships, some units of which are being built in this country, are being formed specially to meet the expansion in trade which the Canal is expected to bring about, and also that arrangements are being made to secure return cargoes. It seems probable that some such preparations may be in progress, but whether they are on the stupendous scale outlined in the advices from across the Atlantic is another story.

There can be no doubt, of course, that the opening of the Canal, providing us as it does with a new and most important trade route, offers great business possibilities so far as the bunkering trade is concerned, and in view of their geographical advantage the coal producers of the United States will probably absorb most of it. It remains to be seen how much shipping will be diverted from Suez to the new route. That will depend in some measure upon the prices charged for American coals at Panama.

A statement is made to the effect that the United States Government proposes to supply best quality steams at about $4.55 per ton at either end of the Canal, which is about $2.40 less than the f.o.b. price of Durham unscreened bunkers at Port Said. No official announcement on the subject appears to have been made, however, and it has also to be remembered that every vessel passing through the Panama Canal will not necessarily bunker there any more than every vessel passing through the Suez Canal bunkers in that locality.

Possible Changes in Trade

Beyond the bunkering business it is difficult to see how the opening of the Panama Canal will benefit the American or injure the British coal trade to any great extent. It will not alter our position with regard to the Atlantic States, to which the great bulk of our South American coal exports is shipped. The Pacific Coast of South America will certainly be more vulnerable to American attack, but our exports to those markets are not very large and, moreover, British firms have secured an excellent footing there; on the confession of the accredited Consular representatives of the United States in the countries in question, it will be difficult to shake our hold on these markets.

It is easy, therefore, to exaggerate the consequences of the opening of the Panama Canal so far as our coal trade is concerned, and we feel sure that British exporters having connections with markets likely to be affected at all are fully alive to possible dangers and are taking steps accordingly. In his paper on the Panama Canal, read before the British Association, Professor Kirkaldy seemed to suggest that it might enable the United States to displace British coal throughout the world, and he urged both the capital and laborer interested to forget internal causes of difference and to unite against the common enemy.

This certainly appears to be an entirely alarmist view of the situation. For some years past now our American friends have been paying more attention to their coal-shipping trade, which, while still small as compared with our own, has increased rapidly of late. It is certain that they are not likely to miss any fresh opportunities which the opening of the Canal may afford them, but why this impending event, important as it is, should deliver a mortal blow to the British coal-shipping trade, we cannot conceive. It is better to be warned, however, even in exaggerated terms, than to remain over-confident when a wealthy and enterprising rival is in the field and it will be well to keep an eye upon the activities of our American competitors.

Bureau of Mines Appropriations

The estimates of appropriations for the United States Bureau of Mines, for the fiscal year ending June 30, 1915, as approved by Secretary Lane, of the Interior Department, have just been forwarded to Congress.

The estimates are as follows:

For general expenses of the Bureau of Mines, $70,000.

For investigating mine accidents, $347,000.

For the equipment of mine-rescue cars and stations, $30,000.

Equipment of testing plant at Pittsburgh, Penn., $10,000.

For testing fuels, $135,000.

For mineral-mining investigations, $120,000.

For inquiries and investigations of petroleum and natural gas, $30,000.

For inspection of mines in Alaska, $7000.

For books and publications, $2000.

For lands, leases, etc., for mine-rescue cars, $1000.

The total for the Bureau of Mines is $752,000, an increase over the fiscal year ending June 30, 1914, of $90,000.

The item of $30,000 for equipment of rescue cars and stations is for the first time placed separately in the estimates and represents an increase.

The $10,000 asked for the equipment of the testing plant is a new item. The money is needed for the purchase of steam and electric equipment. The estimates set forth that the present power- and electric-service plant at the experiment station is on the eve of breakdown.

Some Notes on the Selling Price of Coal

By R. A. Colter*

SYNOPSIS—A discussion of this important question along original lines. The author points out the low earnings realized in the coal business and states that steps must be taken to obtain a better profit. A closer coöperation between the operating and selling departments is essential. Also a more careful study of costs.

❖

It is my intention to discuss the selling price of coal with regards to what relation it bears to the cost of production and how and by whom it is fixed. Wonderful progress has been made in the way of ascertaining definite and accurate costs of production; in the mining field this has resulted, in some cases, in the reduction of costs, but in most instances an increase, on account of the more scientific methods of mining and the safeguarding of life and property.

Often where this scientific analysis of cost indicates an increase, it is probably more imaginary than real for the reason that the coal had been actually costing what the analysis showed and the producer had previously been laboring under a misapprehension. Therefore, when he awakens to the fact that the margin between the actual cost and the selling price had been greatly overestimated, he immediately wants more money for his product.

Fixing the Selling Price

Answering the query—What should be the relation of the selling price to the cost, I would say: The selling price should be:

The Cost of Production
Plus
A Reasonable Charge for the Money Invested and Risk Involved
Plus
The Cost of Selling.

Assuming, of course, that the producer has an average plant, with no extraordinary features, no excessively expensive or elaborate equipment or administrative quarters, his cost is upon an equality with his neighbors and competitors, at least in his own field. His money is no better and worth no more, his risk is equal but no greater, and the proper returns upon his investment is easily established.

The cost of selling depends upon the method. It is not my intention to discuss this question, although allusion may be made later to it, but it is worthy of the same careful research as the cost of production and might well be more definitely known. In answering the question of the relation of the selling price, we have, it seems, described how it should be made and are now ready to determine by whom it should be made.

The responsibility for the low returns in the past cannot be entirely shifted to the shoulders of the selling agent, whether or not he be a producer as well, for the ignorance of the cost on the part of the producer has often misled the selling agent. But we see improvement in this direction by the closer relations between the producer and seller. There was a time when it was only necessary to learn at what price a certain grade of coal was being put into a certain market; that figure was then met or cut, as the case might be, the freight deducted and the balance was the price of the coal. In more remote instances, the process was reversed; the delivered price was made in the same manner but the operator was paid the least he would take for his coal and the railroad took the balance for the freight.

Coöperation between Producer and Seller

This condition having either corrected itself or killed itself, there sprang up another in its stead. The seller appeared who dealt only with tonnage and whose only thought was to move enormous quantities, his interest being solely in the commissions involved or earned, and not how much could be obtained for the coal.

This can only be corrected by coöperation between the producer and the seller by which they are brought to see that their interests are not separate and antagonistic but mutual and interdependent. The two branches, producing and selling, are distinct and the one requires quite as much business acumen and integrity as the other but they can and must be harmonized.

Thus far we have discussed the selling price of coal upon the basis of fixed charges and have not taken into consideration any contingencies that might arise, such as the demand, abnormal market conditions, terms of delivery and payment, all of which affect the selling price to a greater or less extent. A shipper not long ago, during a conversation, remarked, "There is no such thing as a market price, it is simply what you can get for it." This is in a large measure true, but if one is imbued with a knowledge of what one's commodity costs, how it is prepared and under what conditions it is produced—he is more likely to get more for it than he would otherwise.

The fact that a gas coal from another field is being sold in a certain market at what would be a low price for another coal of the same kind does not necessarily warrant the owner of the second lot in meeting that price; instead he should endeavor to find another market which will bring a reasonable figure.

The present knowledge of accurate costs on the part of the producers was not attained in a single day and not without many conferences and much interchange of thought and ideas. This has in some measure been reflected in a more equitable selling price, but it will require considerably more work on the part of both the producer and the distributor to educate the buying and consuming public to the readjustment of prices which is bound to come about soon.

The innovations and reforms in mining and producing coal are not accomplished without some opposition from those whose cherished ideas and pet theories are upset. Neither can the reforms in the handling and selling be accomplished without a frank discussion of the ignorance, errors and abuses attendant upon that branch of the business.

Having assumed that the producer has an accurate cost of production for a start, the question of a reason-

*Secretary and treasurer, the C. G. Blake Co., Cincinnati, Ohio.

Note—Paper read before the winter meeting of the West Virginia Mining Institute at Charleston, W. Va., Dec. 8-10.

able return on the capital involved is next in order. The figures compiled by the Federal Government place the average returns of all mines in the United States for the year 1909 at 3 per cent. on the capital invested, the coke-making mines of Pennsylvania and the Connellsville district being the only exception, these showing returns of over 6 per cent.

The coke-making mines of West Virginia showing returns of 3.5 per cent. and the others a deficit.

The three leading coal-producing states are Pennsylvania, West Virginia and Illinois. These show returns as follows: Pennsylvania, 4.6 per cent.; West Virginia, deficit of 0.9 per cent.; Illinois, 1.7 per cent.

Does this not show conclusively the necessity for figuring on a larger percentage on the investment than has been the custom?

Notes on Selling

As to the cost of selling, this varies according to the volume and method of marketing. While it is a profitable field for discussion, I think there is much misapprehension on the part of the producer as to the actual cost of doing business these days. Especially is this true where the territory is of unlimited proportions, this being partly brought about by numerous inquiries during an active market from more or less unreliable parties, many whom have only desk room in some large jobbing center with little or no financial responsibility. Flattering promises lead the unthinking operator to imagine that his entire product can be sold without any effort. These undersirables are only heard from during active periods, while the legitimate sales agent is hard at work the year round to keep your plant in operation and at the same time maintain the market, which is no small job, I assure you, and worthy of the best efforts of any man.

Then the matter of terms is important. The measure of a tradesman's profit is determined by the time required for the turnover of his stock. If everyone's terms were identical, say, 30 days net, it would be a simple matter, but when we consider that the interest for 60 days at 6 per cent., is from 1c. per ton on $1 coal to 2c. per ton on $2 coal, it can be readily seen how much of the selling price is lost in extra time given buyers.

It is indeed unfortunate that the Federal Government having done so much toward educating the producer to the true value of his property, the scientific compilation of his costs and the safeguarding of life and property, has not been as zealous and active in teaching and helping him to secure a reasonable return for his product. The day of segregated individualism has passed and we have entered upon an era of collective effort which, rightly directed, will redound to the benefit of all. While I am not a prophet, I believe that in the not far distant future there will be a radical change in the attitude of our Federal Government toward the securing of a reasonable return for the product of our mines.

Manufacture and Character of Basic Coke

By J. R. Campbell*

SYNOPSIS—Basic coke cannot be made in beehive ovens as the temperature is insufficient. It can be manufactured in byproduct ovens but only one-third of the original sulphur is converted into calcium sulphide. However, by the addition of lime to coal in the oven to make basic coke, some of the volatile sulphur is retained in the fuel which would otherwise be expelled. As the sulphide is not incapable of reduction in the blast furnace, there is no assurance that basic coke is desirable. Its chief value seems to be that coals which will not fuse into reliable coke can be made to agglomerate with slag as a binder as a result of the addition of a large percentage of lime.

Sulphur in coke is almost wholly present as sulphide of iron (FeS), or perhaps more properly speaking as the magnetic sulphide (Fe_7S_8) and as such it readily dissolves in the iron during the smelting process, unless it is carried into the slag by the use of suitable fluxes. In blast-furnace practice, limestone, which is charged with the ore and coke, slags this sulphur impurity as well as performs other functions.

It is generally believed that the sulphur, in whatsoever form it is introduced into the furnace, is transformed into calcium sulphide (CaS) at high temperatures and, by virtue of its lighter specific gravity, floats off with the slag instead of dissolving in the metal. From this belief is deduced the well known axiom of the furnaceman: "A hot furnace makes iron, which is low in sulphur and high in silicon and a cold furnace makes high-sulphur and low-silicon iron," which is true, unless the furnace is run hot and limy when both sulphur and silicon will be low.

Why Coke Should Not Have over One per Cent. of Sulphur

In passing it may be remarked that the chief source of sulphur in blast-furnace operation is the coke; hence it is easy to understand why the furnaceman always has his "weather-eye" open for the sulphur content of the fuel, especially if it runs over 1 per cent. The average coke operator knows what it means to try to pacify an irate furnaceman if the coke plant has unfortunately shipped a few cars of coke above the prescribed limit in sulphur. Of course, up in the Connellsville region we would not like to be accused, nay, even suspected, of such a breach of metallurgical etiquette, where by repute we have the finest coking coal in the world.

This brings us to the question, "Why does the furnaceman object to more than 1 per cent. of sulphur in the coke?" For often the coal operator is apt to think that the ills of the furnaceman are largely imaginary, and that he is seeking to excuse himself by venting his spleen on the coke, but there is a valid reason why sulphur should not much exceed 1 per cent. if the furnace is to make good iron. Using round numbers, a ton of coke makes a ton of pig iron, and usually about a half ton of slag is produced in the process from which it is easily deduced that with a furnace working properly, the one-half ton of slag must carry all the sulphur in the ton of coke, that

*Chief chemist, H. C. Frick Coke Co., Everson, Penn.

is, it must remove twice as much sulphur per ton as each ton of the coke contains.

Slag Can Dissolve only 2 to 2½ per Cent. of Sulphur

Thus, if a 1 per cent. sulphur coke is used, the slag will have to carry about 2 per cent. to remove the sulphur completely from the iron. Now the practical limit of solubility of the sulphur in the slag is usually considered to be from 2 to 2½ per cent. In other words, unless the furnace is run very limy, which practice is more or less detrimental to the lining, we do not expect the slag to hold more than 2 to 2¼ per cent. sulphur. There are rare instances, however, where the slag has carried 2½ per cent. of sulphur or even more for a considerable length of time.

This limit to the solubility of sulphur in slag is the main reason why the furnaceman does not like his coke to contain much more than 1 per cent. of sulphur. Coke containing much more than 1¼ per cent. of that element has but little metallurgical value for the economical manufacture of low-sulphur iron.

The Attempt to Make Basic Coke Is Not New

In view of the foregoing, many attempts have been made to improve the chemical quality of coke from the sulphur standpoint during its manufacture. This paper concerns itself only with the addition of crushed limestone to the charge of coal or the formation of basic coke. The idea is old. Fulton tried it a number of years ago. I believe he mentions it in his book on "Coke." Lately the scheme has been revived, both here and abroad, the claim being made that the cause for past failure lay in the fact that the mixtures were not scientifically proportioned.

How the Limestone Required Is Calculated

According to the claims of these latest investigators, the limestone must be added in proportion to the ash in the coal to form a slag consisting of a monosilicate of lime. In other words, the limestone addition is calculated much after the manner of determining the burdening a furnace. The following table and example will show how this calculation is made:

TABLE FOR THE CALCULATION OF MONOSILICATES

1 part of SiO_2 combines with:		1 part of base combines with:	
1.0 SiO_2	1.86 CaO	1.0 CaO	0.535 SiO_2
1.0 SiO_2	1.33 MgO	1.0 MgO	0.750 SiO_2
1.0 SiO_2	1.14 Al_2O_3	1.0 Al_2O_3	0.873 SiO_2
1.0 SiO_2	2.40 FeO	1.0 FeO	0.416 SiO_2
1.0 SiO_2	1.77 Fe_2O_3	1.0 Fe_2O_3	0.562 SiO_2
1.0 SiO_2	2.36 MnO	1.0 MnO	0.422 SiO_2
1.0 SiO_2	1.91 Mn_3O_4	1.0 Mn_3O_4	0.524 SiO_2
1.0 SiO_2	7.43 PbO	1.0 PbO	0.134 SiO_2
1.0 SiO_2	3.32 $CaCO_3$		

The table shows in the second column the weight of the bases required to bind 1 part by weight of silica (SiO_2) as monosilicates. The fourth column shows the weight of silica (SiO_2) required to bind 1 part by weight of the various bases as monosilicates.

To calculate CaO as $CaCO_3$ multiply by 1.7857.

COAL ANALYSIS	Per Cent.	COMPOSITION OF ASH	Per Cent.
Volatile matter	39.05	Silica	47.85
Fixed carbon	52.34	Iron oxide	15.84
Ash	8.61	Alumina	23.98
		Lime	4.41
	100.00	Magnesia	1.66
Sulphur	2.09	Sulphur	1.11
			94.85

4.41 of lime × 0.535 = 2.36 per cent. silica (SiO_2) taken care of by lime
1.66 of magnesia × 0.750 = 1.24 per cent. silica taken care of by magnesia

Total 3.60 per cent. silica taken care of by lime and magnesia

47.85—3.60 = 44.25 per cent. silica remaining to be taken care of
44.25 × 3.32 = 146.88 percentage of $CaCO_3$ needed for every unit of ash

$\frac{146.88 \times 8.61}{100}$ = 12.65 per cent. $CaCO_3$ or limestone needed to flux the ash.

From the above, we calculate that 12½ per cent. of limestone, of good quality, is needed to flux the ash. It is the hope also that the sulphur in the coal will pass into the slag during the coking process. Both the coal and limestone must be crushed very fine. The coal should all practically pass a ⅛-in. screen, and the limestone, a 20-mesh screen. The mixture must be intimate and thorough.

Basic Coke in Beehive Ovens a Total Failure

The ash in the coal under test in beehive ovens ran about 8 per cent. The limestone additions were made gradually, as it was early discovered that the physical quality of the coke was impaired, it being soft and crumbling easily.

ANALYSIS OF BASIC COKE

Per Cent. Ash	Per Cent. Sulphur	Per Cent. Phosphorus	Per Cent. Lime in Ash	Per Cent. Sulphur in Ash	Per Cent. Limestone Added
13.93	0.882	0.008	1.65	0.264	3
15.85	0.918	0.010	4.18	0.537	5
19.17	0.878	0.008	5.72	0.594	7½
19.90	1.000	0.013	6.34	0.911	10
27.19	0.942	0.012	12.24	0.998	12½
25.90	1.015	0.010	12.13	1.002	15

ANALYSIS OF RUN-OF-MINE COKE

	Per Cent.
Volatile matter	0.75
Fixed carbon	87.07
Ash	12.18
Sulphur	0.891
Phosphorus	0.014

About 12½ per cent. of limestone was theoretically required to form the so called basic coke, but this high percentage rendered it practically worthless. Failure to secure high enough temperatures in the beehive process may be ascribed as the reason. It is an internal-combustion process and the large quantities of "black damp" (CO_2) given off by the decomposition of the limestone, seemed to smother the fire. In fact, the conclusion was reached that "basic coke" by the beehive process, was a total failure from the physical standpoint.

Basic Coke in Byproduct Ovens

More promise was held forth by the byproduct ovens, as it is a retort method, external heat being applied, but here, too, the claims for "basic coke" were not completely realized.

The temperature of the coking mass is not high enough, even in byproduct practice, to cause the sulphur to pass into calcium sulphide (CaS) during the coking process, as evidenced by the following data:

TEMPERATURES IN COKING MASS OVEN NO. 47 TEST NO. 1

Time	Hole No. 1 Deg. F.	Hole No. 2 Deg. F.	Hole No. 3 Deg. F.
5:30 p.m.	350	325	275
6:00 p.m.	200	225	200
6:30 p.m.	200	225	200
7:00 p.m.	200	270	250
8:00 p.m.	220	250	240
9:00 p.m.	230	260	250
10:00 p.m.	230	260	240
11:00 p.m.	240	280	240
12:00 m.	240	280	240
1:00 a.m.	280	290	250
2:00 a.m.	380	320	250
3:00 a.m.	690	360	290
4:00 a.m.	1220	420	380
5:00 a.m.	1300	720	620
6:00 a.m.	1360	1060	822
7:00 a.m.	1400	1120	880
8:00 a.m.	1580	1550	1510
9:00 a.m.	1700	1700	1680
10:00 a.m.	1770	1770	1770
11:00 a.m.	1920	1920	1950

TEMPERATURE AS PUSHED

Location	Pyrometer	Deg. Fahr.
Hole No. 1	Hoskins	1814
Hole No. 2	Hoskins	1814
Hole No. 3	Hoskins	1830
On the coke mass	Wanner	1938
On the oven walls	Wanner	1992
Flue on No. 46 (pusher side)	Wanner	2370
Flue on No. 48 (pusher side)	Wanner	2300

The study of the temperature chart is interesting. Hole No. 1, for the pyrometer, was located in the charge near the side wall, No. 3, in the center of the charge, and No. 2, at an intermediate point, all on a line at 45 deg. inclination to the axis of the door of the oven. The maximum temperature in the coking mass in good practice was about 1900 deg. F., and rather strange to say even at the beginning of the process it was about as hot in the middle as at the sides, yet raw coal would have appeared in the center had the coke been pushed ahead of time. The flues on either side showed a temperature of about 2400 deg. F.

Only One-Third of Original Sulphur Is Combined with Lime in Byproduct Basic Coke

The analyses of the coal used showed ash 8.61 per cent. and sulphur 2.09 per cent., and the composition of the ash showed that 12½ per cent. of limestone was necessary to form a flux. These detailed analyses have been given elsewhere.

Only one-third of the original sulphur in the regular coke is changed to calcium sulphide (CaS) in basic coke, in which form it is supposed to pass through the blast furnace unchanged and float off into the slag instead of passing into the pig as iron sulphide (FeS) does. This percentage is too small to have metallurgical significance.

Furthermore, the sulphur is higher in basic coke than in run-of-mine coke, due to the lime of the limestone taking on some of the otherwise volatile sulphur in the coal. It was supposed that the limestone would not be decomposed by the heat of the coking process until all of the volatile sulphur had been driven off, but practically this was not true.

Physical Properties of Basic Coke

Another of the claims for basic coke is that the physical quality is improved by the addition of limestone to the coking charge. Within certain limits this is true in byproduct coke—never in beehive coke. The improvement is due to the slag binder if the proper temperature is attained, otherwise the free lime, upon exposure to the air, slakes and causes the coke to crumble and fall apart.

COMPOSITION OF COKE

	Run-of-Mine Coke Per Cent.	Basic Coke Per Cent.
Volatile matter	0.90	2.34
Fixed carbon	85.51	72.70
Ash	13.59	24.96
	100.00	100.00
Sulphur	1.62	1.76

COMPOSITION OF THE ASH

	Run-of-Mine Coke Per Cent.	Basic Coke Per Cent.
Silica	46.87	24.06
Iron oxide	15.61	11.54
Alumina	24.12	9.93
Lime	4.21	48.00
Magnesia	1.41	1.15
Sulphur	0.86	0.61
Sulphur as	93.08	95.29
Calcium sulphide	trace	0.53

PHYSICAL TESTS OF BASIC COKE

	Run-of Mine Coke	Basic Coke—12½ Per Cent. Limestone
Shatter test	70.5 per cent.	31.9 per cent.
Porosity	38.8 per cent.	43.9 per cent.
Apparent sp. gr.	0.900	0.934
Real sp. gr.	1.470	1.666

The shatter test is the crucial determination. It is made according to the U. S. Government's specifications, that is, 4 drops of a given quantity of coke at a height of 6 ft. are made and then the broken coke is passed over a 2-in. screen. The percentage passing through is then determined. In the above examples, 70½ per cent. of run-of-mine coke and 31.9 per cent. of basic coke passed through the 2-in. screen. The latter figure is about standard for byproduct coke.

The Possible Advantages of Basic Coke

The porosity and the specific gravity of the basic coke are better than those values for the run-of-mine coke. In fact, we believe it is possible to take an inferior grade of coking coal, and, by the scientific use of crushed limestone in the byproduct process, make A-1 blast-furnace fuel, where otherwise a total failure would result. As before stated, this is due to the formation of a slag binder in the coke. Owing to the strength given by this binder, vast quantities of low-grade or semi-coking coals would be opened up for byproduct use. Whether or not "the game is worth the candle," at present is without the scope of this article.

There might be some advantage to the furnaceman in having limestone added to the coke instead of with it. There are also some natural advantages to the byproduct operator. The total ammonia yield would be increased by the addition of limestone to the coal, and the percentage of fixed ammonia decreased, which would lessen the work of the stills in the indirect or semi-direct processes.

Finally, the main aim in the search for basic coke has been to produce a slag in the fuel which will carry the sulphur with it. But even if this were possible during the coking process, it could not be safely assumed that the sulphur would not get into the iron in passing through the blast furnace just as it does now without the proper safeguards. In fact, we believe the old assumption that calcium sulphide passes through the blast furnace unchanged, is erroneous, and that it would avail nothing, from the sulphur standpoint, to have basic coke. Calcium sulphide is stable only at high temperatures and in a reducing atmosphere. As the matter now stands, we think that the sulphur in basic coke would be acted upon by the iron ore in the top of the blast furnace and changed back into its original harmful form ready to be assimilated by the pig iron, unless slagged off as usual, due to the action of the metallic oxides on calcium sulphide (CaS) at comparatively low temperatures.

In view of the foregoing, we conclude: First, that basic coke, in the chemical sense, is not practically feasible, nor wholly desirable; secondly, in the physical sense, it has possibilities in utilizing low-grade semicoking coals for byproduct use.

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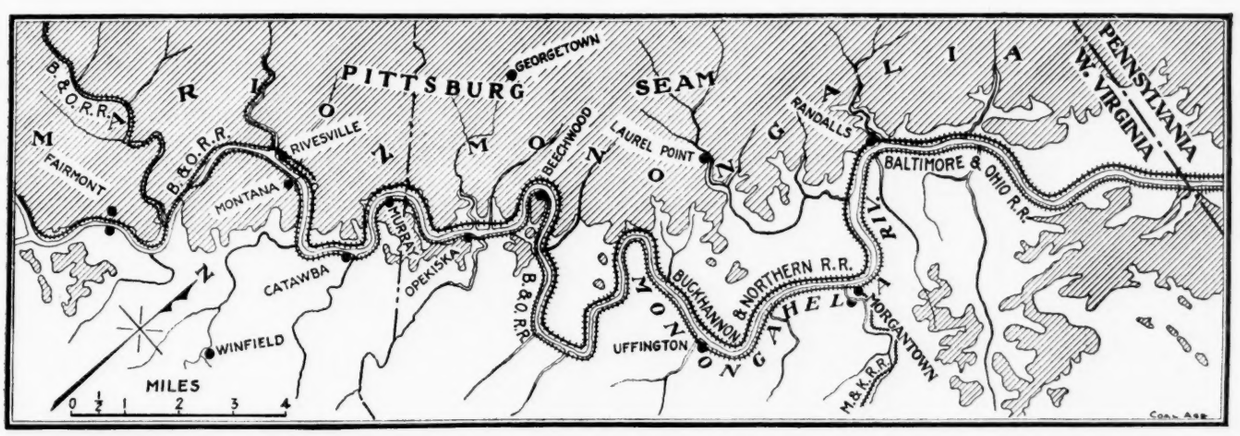
New Freight Rates in Kansas

The Kansas Utilities commission held hearings at Topeka, Kan., during the past week, regarding new freight rates for mine-run coal. This class, under present conditions, takes the lump-coal rate. Consumers advocated that mine-run coal take the slack rate. Operators are against the proposed change almost without exception. Should it be put into effect, slack would be a drug on the market, according to those in touch with the situation. The rate would apply only on shipments in Kansas, even if projected. The commission took the matter under advisement after hearing testimony from all sources and will not announce its decision for some time, according to present indications. Some of the Kansas operators who testified, asserted that the Southeastern Kansas coal field is waning fast. The maximum output, eight million tons annually, will be reached in five years, it was stated. About 6,700,000 tons were mined in 1912.

A New Coal Railroad

The Buckhannon & Northern R.R., now being constructed between Rivesville, W. Va. (five miles north of Fairmont) and the West Virginia-Pennsylvania line, will tap a large area of excellent Pittsburgh coal which has hitherto lain idle, because the Baltimore & Ohio R.R. by some mischance was built on the wrong side of the Monongahela River. As will be seen, without the building of expensive bridges, the road could not tap the Pittsburgh coal bed, except in insignificant areas near Montana, and Opekiska, where there are already mines owned by the Consolidation Coal Co. and the Pittsburg Steam Coal Co. The Upper Freeport and the Lower Kittanning coals can be found on the right or east bank of the river, but they have not been worked along the Baltimore & Ohio R.R. Consequently there is but little activity throughout Monongalia County. The building of the railroad will change this condition and bring a strong competitor into the field.

The Buckhannon & Northern R.R. is being built by the Little Kanawha Syndicate consisting of the Pittsburg & Lake Erie R.R. Co., the Pennsylvania Co., and the Baltimore & Ohio R.R. Co. It will connect at the southern end with the Baltimore & Ohio R.R. and at the northern junction with the Monongahela River R.R., which is owned jointly by the Pennsylvania R.R. Co. and the Pittsburgh & Lake Erie R.R. Co. Thus the coal will find an entry into Pittsburgh.



THE BUCKHANNON & NORTHERN R.R. WHICH WILL OPEN UP THE REGION NORTH OF FAIRMONT, W. VA.

The maximum grades are 0.15 per cent., and several miles are entirely level. The maximum curvature is 8 deg., and as there are only two curves of this sharpness, the maximum severity of curvature may later be reduced to 6 deg. The track is laid with 85-lb. rail, and the work is designed for the heaviest traffic. There are five steel bridges, one a viaduct, 274 ft. long, and another a crossing 290 ft. long, over Indian Creek, opposite Opekiska.

A Large Modern Breaker

Work is progressing rapidly on the new Loomis colliery of the Delaware, Lackawanna & Western Coal Co., near Nanticoke. Over 40 of the 81 concrete footings for the new breaker are in position, and all the other buildings are practically completed. The hoisting engines at the two main shafts and at No. 1 slope are working, and the coal is being taken to the Bliss breaker, two miles away, for preparation.

The buildings of this colliery, all designed by F. J. Nies, the company's architect, will be the most modern and artistic of any in the anthracite region. They are all built of concrete and brick, except the breaker itself, and are all entirely fireproof. The breaker is to be of concrete up to the pocket line, and of steel and wire glass above. The output of the plant will be about 5000 to 6000 tons daily.

Along the north side of the hill, upon which the colliery is located, are the powder magazine, the wash house for the men, the model barn for the mules, the wire and cement house, the ice house, and the fan house with its two 20-ft. fans. In this building, also, is an air compressor with a capacity of 1500 cu.ft. per minute, which will be used for small hoists in the mines. Two more buildings on the north side of the hill are the supply house and the engine house for No. 1 slope. In the center are the two shaft engine houses. The main shafts at present are 930 ft. deep.

On the south side of the hill is the steam plant with its 135-ft. stack. There are shower baths for the firemen in this building, and blast fans for the furnaces in the basement. The power is now supplied by the temporary plant at the foot of the hill, but the large boiler house will be ready in December. At the foot of the hill also are two pretty double houses, concrete with covered pergolas in front, for the use of the mine foremen.

The breaker, which will also be along the south side of the hill, will be the third in the region to be entirely operated by electricity. The power will be supplied by the company's Nanticoke plant, which also supplies the power for the Truesdale breaker, about two miles away. The equipment of the Loomis breaker as to shakers, spiral separators, sorting tables, rolls and jigs will be modeled largely after that in the Truesdale breaker in that every unit of machinery will be operated by its individual motor.

There will be four shafts in all at this operation. The steel headframes, 80 ft. high, are in place over the two main shafts, each 50.4x14 ft., and these shafts are being operated. The shafts are equipped with gooseneck automatic dumping carriages, which dump the coal upon a bucket-type endless conveyor running from the mouth of the shafts to the breaker.

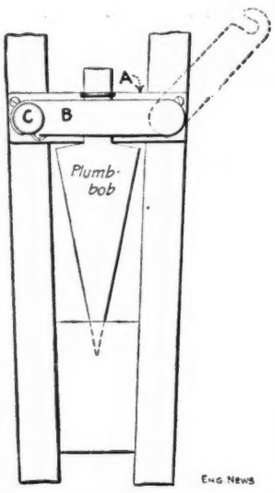
The third shaft is the old Dundee shaft, abandoned in 1851 on account of the gaseous nature of the mine and the lack of proper ventilating facilities at that time. Coal from this shaft was shipped by boat to Philadelphia. The shaft, which was 10x16 ft., has been filled up to get rid of the water in it, and a caisson will be sunk around it and the shaft enlarged to 14x20 ft. The old shaft was 810 ft. deep, and was sunk to the Ross vein. The fourth shaft will be sunk near the Nanticoke power plant, and the coal from all four will be run into the breaker through the conveyor line.

There are 1247 acres in the property, and the buildings with their fireproof construction, resemble a group of college buildings rather than those of a colliery.

A Plumb-Bob Holder

An ingenious device for carrying a transit plumb-bob is described in a recent issue of *Engineering News* as follows:

A plumb-bob holder attached to one leg of the transit tripod has been designed by a Canadian surveyor, as a remedy for the plumb-bob getting lost or punching holes in the transitman's pockets. The cut shows the device applied to a split-leg tripod. The point of the plumb-bob rests in a ¼-in. hole bored ½ in. deep in the spacing block of the leg, while its neck fits between two strips of brass. The inner strip, A, is secured by two screws. The outer strip B is hinged at one end, while the other end is notched to hook over a pin C. This pin is fitted as a clamp screw, so that by a slight turn of the milled head the plate is held firmly in place. Both plates are slightly bent at the middle so as to allow for the neck of the plumb-bob and the string which is wound around it.



PLUMB-BOB HOLDER ON THE LEG OF A TRIPOD

This contrivance is described in the 1913 "Proceedings" of the Dominion Land Surveyors Association, by F. H. Kitto, Director of Surveys, Dawson, Yukon Territory, Canada. He states that he uses this as the permanent receptacle for the plumb-bob, whether in the field or the office.

Vigilance and Co-operation as Factors of Safety

BY W. E. HOLLAND*

Believing that the following recommendations, recently made with a view to reducing the number of accidents, both fatal and nonfatal, occurring in the district, to a minimum, would be of value to all engaged in mining, I submit them for consideration and discussion.

The usual custom, at most of the mines operating in this vicinity at the present time, is for one or more company men to pass through the entries at the beginning of each shift, and examine the roof and take down any loose pieces of slate or rock that are found to be unsafe. While this is a good system, as far as it goes, I believe it can be improved. To my mind, the weakest point in the method is that no one is made responsible for any accident that may occur. It has been my chief endeavor to eliminate this weakness and make somebody clearly responsible for the safety of haulage roads and traveling ways throughout the mine.

For the toiler underground, surrounded as he is by dangers seen and unseen, there is never too much protection at the best; and whatever is worth doing in his behalf, is surely worth doing well. In order to reduce to a minimum the accidents that are of such common occurrence and which arise from incomplete or careless inspection or lack of care and caution on the part of the worker, every effort must be made to awaken both employer and employed to recognize their respective individual responsibilities. It is important that they should realize that they must meet on common ground and amalgamate their efforts to avoid the common mine accidents that are of almost daily occurrence.

REPORTING UNSAFE CONDITIONS

The first recommendation of which I have spoken was to the effect that each company or operator appoint a competent, sober and reliable man, who should go on duty at night shift and make a rigid examination of all the entries and traveling ways throughout the mine. This examination should include the observing of all unsafe conditions of any nature whatsoever, giving particular attention to the security of the roof and coal; and the condition, amount and style of timbering.

The examiner should record in a book, carried for that purpose, each unsafe condition, describing its nature and location. A carbon copy of the report of each examination should be given to the day foreman, whose first duty would be to examine the report and remove or safeguard each of the dangers mentioned. When this has been done the report should be signed by the foreman and sent to the superintendent, for his information.

This system would not only make the mine foreman responsible for the condition of the mine each day; but it would keep the superintendent intelligently informed as to the dangers existing in the mine and would, besides, serve a good purpose as reference, in case of accident. The effect of thus fixing the responsibility for accident, upon each official charged with the work of inspecting the mine or removing the dangers found, would be to increase the degree of caution and efficiency of every mine official. Under such a system, many small details that were formerly disregarded would be given attention.

The second recommendation had reference to a useless practice that has, in the past, contributed so largely to the occurrence of avoidable accidents. I refer to the habit so prevalent among the men and boys employed in the mines, of visiting each other in their respective working places. Not only does this habit result in a loss of time to the workers and, to an extent, reduce the capacity of the mine for putting out coal; but there is a tendency, at such times, for idle loiterers to engage in practices that impair both health and morals. The visiting should be done at the evening fireside, when the day's work is ended.

It should be remembered, in this connection, that when an accident occurs to a man or boy who is out of his place, no one can be held accountable for the same; but the responsibility rests upon the individual alone. There are numerous instances of record where serious injury and even death have resulted from this practice. I would sug-

*State mine inspector, District No. 1, Albia, Iowa.

gest that legislation along this line would help greatly to reduce the number of avoidable accidents.

The third and last recommendation was to the effect that any employee who knows of an existing danger, either in his own or in another working place, or on the road or traveling ways of the mine, shall at once notify the mine foreman, giving its nature and location. Every mine worker should feel his individual responsibility in this regard. The safety of the mine demands this hearty coöperation on the part of every worker, in the effort to remove every source of danger common to mining.

The old adage: *"Eternal vigilance is the price of safety,"* applies emphatically in coal mining. If there is one place more than another where vigilance is an eternal necessity, it is in the dismal domain of darkness where the toiler daily and hourly courts disaster and death, in order to provide the necessities and comforts of home and life for those whom he loves and cherishes.

The point I desire to impress most strongly is that responsibility for safety rests equally on every mine worker, whether he be official, shifthand, miner or laborer. No one is exempt, as far as his ability to observe and act extends. Let anyone who enters the mine realize his individual responsibility for the promotion of safety.

Michigan Mining Interests in Spitzbergen

The Arctic Coal Co., controlled by John M. Longyear, of Marquette, Mich., and associates, has in 1913 shipped 35,000 tons of coal from its mines in Spitzbergen, within the Arctic Circle. The coal has gone to continental ports. The company owns two steamers, one the "Kwasind," of 3800 tons burden, that regularly carries coal in the shipping season, the months of July, August and September, and the "William D. Monroe," a whaler that is used in transporting supplies, but it depends for most of the tonnage it needs on season charters.

It is 10 years since Longyear's attention was first directed to the coal resources of Spitzbergen, and the present stage of the Arctic company's enterprise represents eight years' continuous development, conducted on a constantly increasing scale.

Great sums of money have been spent in the field by Longyear and his associates, and the only returns so far have been the few cargoes sent to civilization. But the region possesses termendous resources in coal, and if all goes well the men interested in the Arctic company will be richly rewarded, both for their daring and the persistence of their efforts to have the international status of Spitzbergen satisfactorily determined.

The shipment of 38,000 tons of coal to southern ports this year was more than has been forwarded in any previous season and more, also, than will likely be forwarded next year, for the shipment was incidental to the development of the property. The stage of actual mining on a commercial basis has not yet been reached. However, the preliminary work has been well advanced and Longyear expects that the company's operations will soon be definitely determined. Much equipment will have to be installed before the property is in readiness for production on a large scale. The general manager is Scott Turner.

A deposit of more than 60,000,000 tons has been indicated by the operations to date. The mines are worked by 250 to 300 men, and, although the shipping season lasts but three months, mining is carried on throughout the year. The geological conditions place no bar on successful mining in the Spitzbergen fields. The beds are uniform to a surprising degree, running about 3½ ft. thick, and the mining problem is simple. The coal is undercut, and drops from the sandstone capping which overlies it. The sandstone makes a stable roof and has to be supported with comparatively little timbering. However, other conditions raise some question as to what part of the coal can be taken out.

The international phase of the matter is one that continues to give concern to the men interested in the company, for Spitzbergen remains No Man's land, and although the Arctic company holds title to its 170 square miles of land by purchase from a Norwegian company, by exploration and by possession, it is regarded as an interloper by the northern nations of Europe, and its rights may not be established without a fight.

In fact, the company's land has already been entered upon by a force of Russians, who have undertaken exploration and who have carried it forward sufficiently so that they have shipped a cargo of coal. What to do about these invaders is only one of the many problems that give concern to the officials of the Arctic company. There is a strong suspicion that they have pursued their course with the knowledge of the Russian government.

Norway has made several attempts to bring together representatives of eight leading nations in a conference in which steps will be taken to determine the status of Spitzbergen, but so far the conference has failed to eventuate. It seems impossible to agree on a time when all the powers are willing to settle down to the task of determining how Spitzbergen shall be governed, or what rights will be respected there.

Our Federal Government Has Given but Small Assurance of Protection

The officials of the Arctic Coal Co. have met with no more success obtaining satisfactory assurances about the backing it will get from the American state department than Norway has encountered in bringing the powers together to deal with the subject. In one of President Taft's messages reference was made to the anomalous condition existing in Spitzbergen, and the necessity of protecting American interests, but so far there has been no more definite declaration that Americans who have made investments in Spitzbergen will be protected by the Government in the final scramble for land and power.

That this is the case is not due to a lack of representations by officers of the company to the state department, but to the reluctance of the officials of that department to act finally on the matter. Longyear has frequently had the matter before the undersecretaries, and recently discussed it with Solicitor General Folk and other officials. This last interview gave Longyear considerable satisfaction and he is hopeful that steps will soon be taken to define the position of the American government in relation to Spitzbergen. With the Russians aggressively in possession of tracts of the company's land, and showing every evidence of a purpose to go ahead and mine coal, this naturally is a matter of great interest to the men who have staked so heavily on the exploitation of the Spitzbergen coal fields.—*Engineering and Mining Journal.*

Meeting of Coal Mining Institute of America

SYNOPSIS—The winter session of the institute was the most successful in its history, and the papers were all of unusual interest. The principal discussions were on the effect of adding foreign bodies to coal before coking, on profits of efficiency and their distribution, and on Rule 18 of the Pennsylvania State mine law.

The meeting of the Coal Mining Institute of America was called to order by W. E. Fohl, president, at 10 a.m., on Dec. 4, in the assembly room of the Fort Pitt Hotel, Pittsburgh, Penn. The short initial session was entirely taken up by regular business of the less interesting kind. The president declared that he had no address to deliver, so the meeting was soon adjourned.

After lunch the assembly room filled to overflowing and several extra chairs had to be provided for the unusually large attendance. Harrington Emerson's address (see p. 886) entitled "Efficiency in Coal Mining," was most interesting, but perhaps the best feature of his part of the program was his reply to criticisms, in which he digressed slightly from bituminous coal mining in obtaining illustrations of his ideas.

The principal objections were to his argument that strikes are unnecessary, and to the practice of the efficiency experts in bringing all the pressure to bear on the employer and not on the employee. So long as the latter regarded efficiency as a means of making money for the operator, so long will he oppose it. As a matter of fact, the chief gainer in efficiency will be the workingman, but he must not claim the whole gain or there will be no inducement for the operator to sink his money in increased efficiency. On the whole, however, the differences of opinion were rather in expression and emphasis than in real essentials.

Other Speakers

Among those addressing the meeting were C. L. Clark, S. A. Taylor and Thomas L. Lewis, the latter being the ex-president of the United Mine Workers of America.

Clyde G. Brehm, electrician of the Oliver-Snyder Steel Co., Uniontown, Penn., then read his paper on "Safeguarding the Use of Electricity in Mines." This paper appeared in last week's issue of Coal Age. H. H. Clark responded in general approval of the paper. Jesse K. Johnston's paper, entitled "A Study of the Wages and Selling Price of Coal in the Pittsburgh District," will also appear in an early issue. It was exactly described in the title as the author made no attempt to analyze causes or to draw deductions.

After a few complimentary references to E. W. Parker's analysis of the conditions of the coal trade in the bituminous regions (made at the American Mining Congress), there was no further discussion of note. In apparent contradiction of A. J. Moorshead's dictum in Philadelphia, the coal operators did not "just like to talk about their troubles."

The institute banquet was also served in the assembly room. H. M. Wilson, engineer-in-charge of the Bureau of Mines, Pittsburgh, Penn., addressed the meeting on industrial safety. In his speech he claimed for the mining industry the honor of being the source of the widespread movement for the conservation of life. C. L. Fay then made a plea for subscribing memberships at five times the regular yearly rate and found several volunteers. Dr. W. J. Holland, director of the Carnegie Museum, who was erecting a diplodocus in Spain, was unable to be present. Thos. L. Lewis addressed the audience and made quite a favorable impression.

The Question Box

The question box was then opened by John I. Pratt, state mine inspector at Pittsburgh, the first question being: "Should rescue work after mine disasters be performed by men in the employ of the coal operators, or by specially trained corps maintained by the federal or state government? The answer is obvious enough. It would be unfortunate, indeed, if the whole burden of rescue were to be placed on any official body. However, the persons discussing the questions, including J. W. Paul, took up a larger view of the question and discussed the reasons for the continued existence of state and federal rescue corps and the matter of control. In brief it may be said he did not claim or desire any dominating authority for the federal corps. For further details reference may be made to an editorial in this issue on the National Mine Rescue Service. As the question box took up much time, the other questions were reserved for the following morning.

Which Race of People Is Most Subject to Accidents

The first question at the morning session was: "Are accidents more frequent among the foreigners from Italy, Hungary, Poland, etc., than among English-speaking people? As we hope to publish H. I. Smith's reply, it is enough to state that the figures of the West Virginia Department of Mines show the most meager variation between the death risks of natives and foreigners. Unfortunately, West Virginia is probably the only state publishing statistics of the nationality of living and uninjured miners, though nearly all states publish the nationality of those injured fatally or otherwise. Mr. Smith's figures were for one year only and some nationalities, notably the English, are not represented in proportion sufficient to give any exact determination.

The third question evidenced the conviction of the questioner, F. C. Keighley. It is stated as a declaration of principles. It had reference to the injustice of enforcing Rule No. 18 of the Mine Code without considering local conditions. Rule No. 18 refers to the driving of exploratory drill holes 3 ft. ahead of shot holes when approaching clay veins. The old law has the same provisions as the present, but by the omission of a preposition or so, and the change of punctuation, the provision has been totally changed so as to refer to all narrow workings instead of to clay veins in headings.

Exception Is Taken to Attorney General's Ruling

S. A. Taylor took exception to the attorney general's ruling in favor of a drastic interpretation of the law, and pointed out how the wording had been changed without the knowledge of anyone that a modification was intended. He believed the law as originally written was perfectly logical. Clay veins are frequently crevices filled with clay, which crevices extend from the Pittsburgh coal up

to the Sewickley and Redstone measures. Large bodies of gas are let loose when these crevices are uncovered, and it is best to let these stored-up bodies of gas loose by a small hole where their escape can be observed and controlled, rather than to let them be suddenly uncovered by a heavy shot. The approach of a clay vein is easily forecasted for the coal gets hard and gnarly. It is wrong to say the law would be a dead letter if it applied only to clay veins on the ground, and that it was only of force when the workings reached an indeterminable point, because clay veins do give advance warning of their presence.

F. C. Keighley then presented his case as against the state. His company had not definitely determined to drive up its rooms throughout the mines and let the pillars stand till later, but that was practically its present practice in places. The first recovery was only 15 per cent.; the other 85 per cent. might stay for five or ten years. The pillars left were 90 ft. wide. When he attempted to run crosscuts through these pillars after long exposure to the air on both sides, rule No. 18 was enforced against him. He regarded it an unfair provision. He had clay veins but they were not such as Mr. Taylor described. They were clay rolls in the floor, and they never cut the coal down to a thickness of less than two feet, and never had any leaders passing up to the top of the seam. They could not carry gas, therefore, from other beds.

Mr. Smith explained that the laws were not punctuated till printed in pamphlet form. The punctuation was then added by an editor. The legislature had nothing to do with periods, colons, semicolons and commas.

Election of Officers

Three other questions which were to have been discussed were ruled out by the chair for lack of time. The elections then took place, and the following were elected for the coming year:

President, J. K. Johnston, general mine superintendent of the Pittsburgh Plate Glass Co., Creighton, Penn.; 1st vice-president, W. Seddon, Brownsville, Penn.; 2nd vice-president, A. P. Cameron, superintendent of the Westmoreland Coal Co., Irwin, Penn.; 3rd vice-president, I. G. Roby, state mine inspector, of Uniontown, Penn.; secretary-treasurer, C. L. Fay, Wilkes-Barre, Penn.

G. A. Burrell then read a paper on the "Relative Effect on Men and Small Animals of Small Amounts of Carbon Monoxide." This will be reproduced in an early issue, so it is only necessary to say that Mr. Burrell's statement that opinions differed as to what were injurious doses of monoxide was fully borne out in the discussion. We hope some time that Mr. Burrell will answer W. J. Price's question as to the manner in which the Bureau compensates for the changes produced by a large animal or man on the percentage of vitiated air in the atmosphere of the test chamber. In some manner this question was overlooked.

Papers on Coke

The article on "Basic Coke" (see page 894), by J. R. Campbell, chief chemist of the H. C. Frick Coke Co., followed and was discussed after lunch, as was also the paper of F. C. Keighley on "What is the Proper Method of Sampling the Beehive Coke Oven for Analysis" (see page 890). It may be noted that by basic coke is meant coke in which the alkali bodies exceed the acid bodies in the coke substance. There is another definition used in the trade. This declares basic coke to be coke which is too high in phosphorus to be used in a bessemer converter. The name "high-phos coke" is sometimes used for fuel of this description.

Mesabi Ore Was Mixed with Powdered Coal, but Result Was a Failure

Mr. Keighley stated that he had mixed 10 per cent. of Mesabi ore with powdered coal and obtained a strong coke, closely resembling the ordinary run-of-mine variety, though it rusted somewhat badly when watered. The manufacturers wanted to offset the dustiness of the ore by introducing it into the furnace as part of the coke charge, but 10 per cent. was regarded as being too small a proportion so it was raised gradually to 20 per cent. The result was a failure, as the final product was a fluxed material of no possible value as coke. Later attempts were made to use breeze in the oven charge, but the results were not encouraging.

J. L. Sherrick declared that 2600 deg. of temperature were necessary for the lime to form a slag in the coke, and he could not see how that action could take place in the byproduct oven where the heat was insufficient. E. B. Wilson discussed the addition of sodium chloride to the coal. This, J. R. Campbell stated he had tested and was full of hope that it would solve the problem. However, as the product ammonium chloride instead of ammonia was formed, the indirect process of producing sulphate of ammonium had to be adopted. This made the addition of common salt to the coal undesirable.

E. W. Parker asked F. C. Keighley if the coal was crushed before coking in the Connellsville region, and the latter stated that one concern had crushed and washed its coal and found the percentage of sulphur increased over uncrushed and washed coal. They found they obtained better results by cracking the coal. By not producing so fine a powder, the flake "sulphur" could be separated. When crushed, this "sulphur" became fine and could not be removed from the coal. He believed this flake "sulphur" came from solutions which descended through the roof. It was his experience that coal was higher in sulphur when found under a sandstone roof, which is permeable, and lower in sulphur when under a close shale roof.

W. F. Elwood neither came nor sent his paper on "Stray Electric Currents," and the meeting proceeded to W. R. Crane's interesting address on the "Coal-Mining Fields and Transportation Problems in Alaska." The address on "Portable Electric Mine Lamps," by H. H. Clark, interested and pleased the audience, but did not draw out much discussion.

Finally with the nomination of a committee on electrical affairs to discuss the adoption of standards for electric mine lamps, the meeting closed. The committee thus formed consists of C. A. Means, electrical engineer to the Department of Mines; R. N. Hosler, chief engineer of the Rochester & Pittsburgh Coal & Iron Co., and H. T. Booker of Monongahela, Penn.

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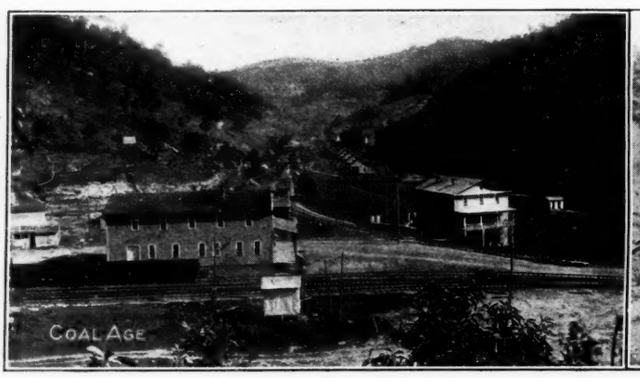
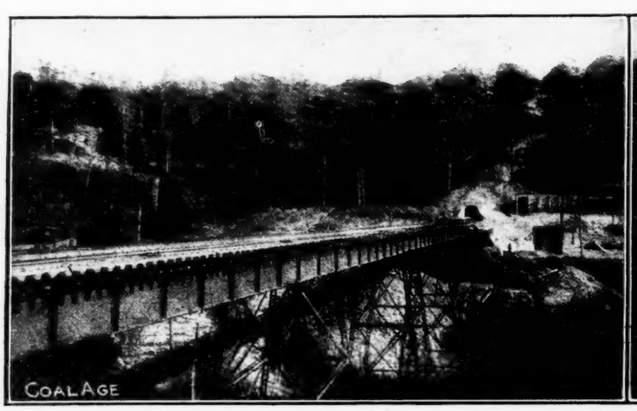
Asphalt residue from petroleum and water-gas, tar and pitch in large percentages are the best briquette binders for lignites that are caked by fire. Starch, magnesia and sulphite liquor are the best for noncaking lignites. With grates constructed so as to hold the fire together, lignite briquettes without any binder give good results.

SNAP SHOTS IN COAL MINING

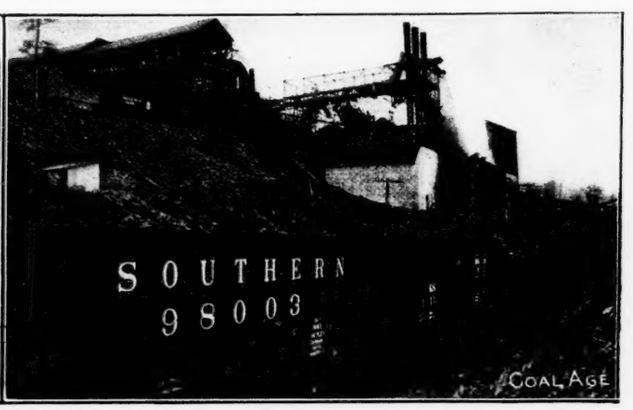


SHOWS HOUSES AND STORE OF NORTH EAST COAL CO., AT THEALKA, KY.

PUMPING WATER OUT OF CROWN HILL NO. 1 MINE, AT CLINTON, IND., WITH "AIR LIFT"



STEEL DOUBLE-TRACK INCLINE, CONNECTING TIPPLE AND MINES, RODEN COAL CO., MARVEL, ALA.



GENERAL VIEW OF TIPPLE, POWER HOUSE AND WASHER OF RODEN COAL CO.

SHOWS DAMAGE DONE TO CLOVELLEY TIPPLE, VIGO COUNTY, IND., BY EXPLOSION ON NOV. 10

Coal Plants in Mexico Are Destroyed

1. Ruins of General Coal Office and Manager's Residence at Lampacitos.
2. Remains of Lampacitos Warehouses, Etc., with Ruined Buildings in Background.
3. Wreck of Fan and Lamp House at Mine No. 3, near Rosita.
4. Condition of Some of the Executive Buildings at Agujita.
5. This Is What Remains of the Lampacitos Coal Washer.
6. Shows What Remains of the Agujita Washer. This Property Was Destroyed by Rebels. All Work Now Suspended Except Fans and Pumps at the Agujita Mines.
7. Interior of Lampacitos Power House. All Equipment in Plant Is Now a Total Loss. The Installation Included Two Direct-Connected Generators and Two Belted Sets.
8. What Remains of Machine Shop at Cia Carbonifera de Sabinas Rosita.

The Necessity of Organization

By Thomas L. Lewis

SYNOPSIS—Mine labor is about as efficient today as it was several years ago. By organization the miner has given stability to the industry. Disputes between operators and labor unions could be advantageously and peaceably settled and the operators otherwise greatly benefited if they were as strongly and thoroughly bound together as are the miners.

I was much interested in the paper read by Mr. Emerson. To discuss every phase of this question would take more time than could be allotted to it this afternoon. There were so many facts stated in that address that every man in this audience, young and old, ought to be not only willing but anxious to express his opinion either for or against what was said.

I have no criticism to make of his position with reference to efficiency. If I were to presume to criticize any part of the address of Mr. Emerson it would be that part referring to the cost of producing a ton of coal. Not that the statements as made are incorrect, but a wrong impression will go out to the American people as to what it actually costs to produce a ton of coal in this country, and it will make it much more difficult to get a fair price for a unit of output.

The trouble with the coal industry is that fuel in this country is being produced at such a figure that at the present selling price the consumer is demanding that we give the product to him for nothing, notwithstanding the fact that we are exhausting a valuable resource. Nobody seems to be interested except to get a ton of coal at such a price that there is practically nothing in it for the producer. I know of a number of corporations in this country who are charged right and left with bleeding the public on the one hand and robbing the workingmen on the other, and yet, with the most efficient appliances they can get, they are on the verge of bankruptcy. This is the usual condition with coal companies.

Labor Is Not Much Changed

However, I am not going to agree with my friend on the left that the labor of today in the mines is much different from what it was 25 or 30 years ago. I worked in the mines 35 years ago, when the dominant, or the predominant mine workers were the British, the French and the German people. And when I say British, I mean the Irish, Scotch, English and Welsh. They in their line were neither better nor worse miners than those of today. It is now a question of having competent men, in most instances who know how to operate a machine to cut coal. At that time it required skill, muscle and brain power, because we had to mine it all, shear it and block it down without the use of an ounce of powder. But we have got away from that today. We now recognize that there is no necessity for that method. If proper time is taken and proper effort is made and intelligent methods used, we can produce a better grade of coal under our present system, with machine mining, than we could under the old system with pick mining, wedge and sledge.

I believe the gentleman on the right—and I am diverging now possibly from Mr. Emerson's paper—at least indirectly, where he takes the position that what we need today is to get to the operative. Rather get to the mine workers in this country. Let me ask you this: How much time is taken by the mine managements, by the operators, by the institutes of this character—and you are doing a splendid work—to impress the ideas that are brought forth here back upon the minds of the men who swing the pick and the shovel? How much space will the public press in the great city of Pittsburgh devote in the columns of their papers to the elaboration of the splendid ideas you men bring forth in this Institute? The chances are that tomorrow morning you will pick up a daily paper and see about two or three or maybe four inches of space buried back among the advertisements. Why? If we want to find out why we cannot make our people more efficient, more progressive, more determined to lift the coal industry to a higher standard, let us go back—and I am going to talk from an operating standpoint, though I am not an operator—and ask ourselves as operators how much time we have devoted to the work of efficiency as applied to getting to the mine workers?

That is where we are lost. We understand those questions here. We can discuss them here from our standpoint. We know what the remedy is. But there are nearly 800,000 mine workers in this country, of every nationality under the sun, who have not the faintest conception of what is meant by raising the standard of efficiency of labor. And we must reach those people.

Now as far as the nationality or class or kind of people is concerned, working in the mines, what do we find? Why has the Italian developed into an objectionable laborer in the mine? Not because he is any less strong than his fellow worker of some other nationality; not because he is not disposed to learn to swing a shovel just as quickly; not because of his inability to learn any other kind of work in and around a mine. But because by nature he is impulsive and much more easily appealed to through his prejudices and his passions than the other nationalities are. The result is that he is more apt to resort to things that we term un-American. They cannot conceive of a system where they ought to be subordinated to the will of law, where they ought to conform to our general ideas of Americanism, and the result is that in every industrial struggle in this country we find the Italian more apt to resort to the old Feudalistic system of force than to permit himself to be appealed to in reason or intelligence.

That is generally true of the Italian. It applies to certain other nationalities, though probably not to the same extent. And we find, as stated by Mr. Emerson, that strikes are a deplorable, and in my opinion a ridiculous, proposition. Why do we have strikes? On one side we have an organization of mine workers which has sought to improve the conditions of their membership. We find that by insisting upon being paid certain rates of wages for their labor they have given more or less stability to the coal industry. That is a matter that is subject to proof. Back in 1896 and 1897 the average operating company in this country was on the verge of bankruptcy; the average miner in this country was on the verge of

Note—Impromptu address before Coal Mining Institute of America, Pittsburgh, Penn., Dec. 4, 1913.

starvation, and when he worked steady every day he could not meet his honest obligations. Why? Because of a disorganized condition existing between the mine workers and the mine operators. A mine operator is not seriously opposed to his employees organizing, because he feels that it is going to help him. But the trouble has been that the operators have been inefficient in not learning the lesson of united effort. If they had learned that, they would have been organized all over this country and they would then have been in a position to say to the mine workers, "We will go along as far as it is right, just that far and no farther."

The Remedy for Petty Strikes Which Are Now Becoming Frequent

And we find another condition developing. The other condition is what I call stand-pat, local strikes in violation of contracts now in existence. Now what is the remedy for that? First it is up to you to get together and say, "If we are going to have contracts we are going to live up to them, and we are going to make the other fellow live up to them." It sounds harsh, but we live in an age of organization. Our very country is founded upon it, and we might as well attempt to empty the water out of the ocean into space as to try to disorganize any form of organization in this country.

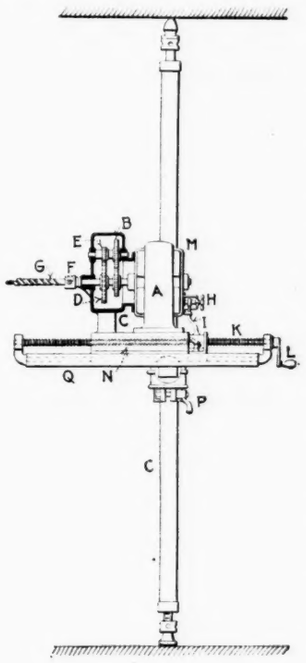
What we want to do is to make every mining organization a lawful and a legal organization, with a fixed purpose, and that fixed purpose the uplift of the mining industry. First, because we are selfish enough to believe that our own interest begins with the mining industry when we are connected with it, and then we are willing to help uplift the whole country. But with 750,000 miners, and, counting operators, mine bosses, fire bosses, weigh bosses, as well as the operating managers of the different corporations I would not be far wrong in saying at least 75,000 more, every one of them supposed to be an unusually intelligent man to hold his position, what influence do they wield? I know I am talking plainly, but that is my weakness. I realize that if the operators of this country will organize as they should do, you could begin talking efficiency with effectiveness. You could say to us fellows in joint convention, "We believe you are entitled to certain things for your labor, and we are entitled to certain considerations in the operating and developing of our properties and we are going to have them." Intelligence would compel both sides to come together on reasonable grounds, and I think strikes would be a thing of the past in the mining industry of this country.

I hope no one will take offense if I have been too plain spoken expressing these few rambling ideas. I always invite criticism of whatever I have to say myself, and I always reserve the right to criticize anyone else—not the individual, but his method of doing business and his action. At first I did not know that I was to have the privilege and the honor and pleasure of coming here and listening to a discussion on such a vital subject, especially to the coal industry. I am glad I was able to come, because I have learned a great deal and I expect to go away from here having learned a great deal more, even though my time is limited. And I want to thank the Institute, therefore, for the privilege and the honor of being permitted to address this assembly and express a few thoughts.

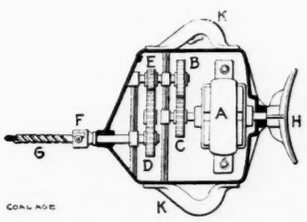
Recent German Drilling Practice

From an article on Prussian mining practice during the year 1912, in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," the following information is obtained:

At the Bismarck mine of the Königsgrube in the Königshütte district, trials have been made with electrically driven column drills, as shown in Fig. 1. A three-phase-current motor *A* of one horsepower and 120 volts, drives, through the gearing *B, C, D, E*, the drilling head *F* in which is seated the twist drill *G*. By turning the handle *H*, which is seated on an eccentric shaft, through 180 deg. the feed nut *I* engages or is released from the feedscrew *K*. This screw is turned by the feed crank *L*, which causes the nut *I* to move the housing *M* forward or backward on the slide *N*. The drilling machine is mounted on a double-screw column *O* by clamp *P*. The drill entire was furnished by the Schlesische Gruben und Hüttenbedarf G. m. b. H., of Kattowitz, its price being about $600.



The Siemens-Schuckert Works build a machine resembling it which does not contain the slide *N*, but is equipped with a closed nut on the feedscrew and an automatic feed.



Two Electric Drills in Use in German Mines

Electric Hand Drills

The experiments with the above machines have been successful, but the adoption of post electric drills has been limited by the new electric hand-drillers which have been placed on the market by the same firms. In these the design of which is fundamentally like that of the column machines, a three-phase motor of a half horsepower using current at 120 volts and 50 cycles is used. It operates through the gearing *B, C, D, E* and the boring head *F* in which is placed the twist drill *G*, Fig. 2. The drill is fed by the pressure of the workman against the breast plate *H* and the switch is placed in the handle of the machine *K*. The weight of the entire drill is about 24 lb.

The output of a single machine in coal is equal to that of good hand-hammer drills. It turns out a coarse drill dust. This is an important matter because of the dangers of fine coal. A further advantage, particularly in pillar work, is the almost noiseless operation of the machine. Few repairs have been found necessary so far. As to the economy of the drills, a judgment can only be

formed after longer service. It is, however, to be assumed that, in spite of their higher purchase price (which is with appurtenances about $225 each) they will be found cheaper in service than hand-hammer drills because it is less expensive to transmit electricity than compressed air and less power is required than with a pneumatic drill. The exhaust does not furnish ventilation and the drills are unsuited for operation in rock but otherwise they are as available for drilling as hand-hammer drills. They are being used successfully in other mines besides those named.

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Winter Meeting of the West Virginia Coal Mining Institute

The meeting of the West Virginia Coal Mining Institute followed the schedule on Monday exactly, except in the matter of the address of Fred C. Keighley, who did not put in an appearance.

On Tuesday morning E. N. Zern made an excellent report on the membership of the institute and on the means whereby that membership can be increased. All the officers of the previous year were reëlected unanimously, which perhaps was unfortunate as one, J. F. Healy, has moved recently from Elkins, W. Va., to Utah.

The officers elected were: President, Neil Robinson, Charleston, W. Va.: Vice-presidents: George T. Watson, vice-president Consolidation Coal Co., Fairmont, W. Va.; John Laing, coal operator, Charleston, W. Va.; R. S. Ord, general manager, Elkhorn Coal & Coke Co., Maybeury, W. Va.; J. F. Healy, general manager, 1240 E. South Temple St., Salt Lake City, Utah.; J. C. McKinley, coal operator, Wheeling, W. Va.; secretary-treasurer, E. N. Zern, professor of mining engineering, Morgantown, W. Va.

Frank Haas was delayed by a freight wreck at Parkersburg, W. Va., and telegraphed that he could not arrive till 5 o'clock, and, therefore, would not come at all. His paper was not read.

J. W. Hunt read a paper on "Overcutting Machines," to replace an address on "Continuous Cutting Machines," by John S. Walker, Jr. This was followed by a discussion on mining education by I. D. Shaw, secretary of the Industrial Department of the International Committee of the Y. M. C. A., New York City.

In this discussion, D. C. Kennedy, E. B. Wilson, R. A. Colter, C. R. Jones, W. H. Grady, J. E. Beebe and R. D. Hall participated. The discussion covered every ground from most elementary education to preparatory teaching for mine foremen and firebosses. Mr. Jones spoke relative to the work of the University and his hope that it may be extended to the various mining towns. He also referred to the bill for congressional aid of mining schools, and in the afternoon a resolution strongly supporting this bill was unanimously adopted.

E. W. Parker suggested that Neil Robinson, who is also president of the West Virginia Coal Operators' Association, endeavor to interest them in the success of the institute. In the afternoon this was also made the subject of a resolution.

In the afternoon R. A. Colter read his paper on the "Selling Prices of Coal," and J. F. Callbreath, secretary-treasurer of the American Mining Congress, and Carl Scholz, president of the same and a former mine official in West Virginia, addressed the meeting on the purposes of the congress. An article on "Pocahontas Mining Methods" was then read by W. H. Grady, of Bluefield, W. Va. John Laing spoke on the Department of Mines.

The discussions, except during the morning session, were somewhat short. If greater encouragement had been given, more would have been said. In fact, several persons had prepared written discussions of Mr. Grady's paper, but were somewhat slow in rising to their feet. Neil Robinson's ability to say the right thing at the correct time with grace, clarity and force was generally remarked, but some wished that he had given a little more place to discussion. There is perhaps not a mining institute in the country with as accomplished a speaker as Neil Robinson occupying the position of president.

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The Largest Mine Hoist in America

The North Butte Mining Co. recently awarded the contract for a new electric hoist to the Westinghouse Electric & Mfg. Co. This machine will be installed on the new Granite Mountain shaft of the above named company and it is believed that it will be the largest electric mine hoist in America.

The hoisting drums will be 12 ft. in diameter and direct connected to an electric motor driven from a motor-generator set at a speed of 71 r.p.m. The motor-generator set will be equipped with a 50-ton flywheel to secure elimination of the peak, incident to the period of starting and acceleration.

Skips will be hoisted, each containing 7 tons, by a rope 1⅝ in. in diameter, at a normal rope speed of 2700 ft. per min. with a maximum of 3000 ft. per min. The capacity of the hoist is such as to permit 300 tons per hour being raised from the 2000 ft. level or 200 tons per hour from the 4000-ft. level.

The motor will be of the type used in steel mills and will consequently be of extremely heavy construction. All the equipment has been designed with absolute reliability as the paramount consideration. A number of special safety devices are included in the equipment, among which are electrically released brakes, automatic slow-down devices to prevent the skip or cage ever going through the head sheaves and a special controller to limit the speed when hoisting men. The installation furthermore is so designed that the draft of power from the power line will be practically constant throughout any hoisting cycle.

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The Production of the Mines

According to the figures prepared by the Geological Survey the total mineral production of the United States in 1912 aggregated $2,243,630,326, or about six times the value of the output in 1882. During that time the population has about doubled but the per capita output of the mines has increased from $7.27 to $23.47. Values of pig iron increased from $106,000,000 to $420,000,000; copper from $16,000,000 to $205,000,000; gold from $32,000,000 to $93,000,000; lead from $12,000,000 to $37,000,000; zinc from $146,000,000 to $650,000,000. The value of coal produced in 1912 was about double the total mineral output of 1882. In 1880 the average value of mineral products was about $1,000,000 a day, but in 1912 it was over $6,000,000 a day. The figures given are the latest official estimate issued by the survey.

EDITORIALS

The National Rescue Service

The problem arose in the question box at the recent session of the Coal Mining Institute of America whether the operator, the state inspectorate and rescue forces, or the federal rescue service should take the lead in mine disasters.

The members of the Bureau of Mines frankly admitted that the local forces had a considerable advantage over the corps of the government on their earlier arrival at the mine opening and in their greater knowledge of the conditions in the mines. This, of course, cannot be questioned, although a knowledge of the nature of the explosions occurring in other mines and of the tactics used in other places is no small advantage; for good generalship in war commonly exceeds in value any mere local knowledge of the roads, streams, hills and forage, in the tactical field.

Perhaps the most remarkable feature in the discussion was the readiness of both the state corps and the Federal Bureau of Mines to coöperate as to the need of indefinite continuation of official rescue work. Retirement from any line of effort is not a common practice of those who are employed by state and nation. Self-perpetuation is more usually the chief aim of such bodies, regardless of public advantage. We are glad that the Bureau of Mines and the Illinois officials are exceptions to that rule.

It was pointed out that the burden placed on the operators of Illinois, following the "Cherry" mine disaster had put them at a considerable disadvantage in respect to coal-mining corporations in competing states, and so the legislators, feeling that the discrimination arising from state lines would work undue hardship on the industry in Illinois, argued that, at least temporarily, it was well to relieve the operators in their state of the obvious necessity of providing rescue apparatus for mine recovery. That need will not be adequately met till there is rescue apparatus at every mine or group of mines.

The members felt that ultimately such protection would be demanded, and thought that the need of it was already powerfully exemplified by the fact that some of the operators were providing such apparatus and training stations at their mines before there was any legal compulsion.

Like them, we cannot but feel that the need for state or government stations, or both, will entirely pass away with the progress of corporational activity in this line. Even if every company should, at some future time, have its own corps or should participate in providing the services and equipment of some central rescue body, still there would be need for men of experience in actual rescue and fire-fighting work, just as there is need for a standing army in a nation, despite the readiness and eagerness of volunteers.

There is no lack of bravery among miners. That fact has been evidenced again and again, and perhaps it hardly needed the earnest expression of its truth delivered by E. W. Parker. Such appreciations are necessary, however, because the work of bravery should never pass without its laurel.

But in actual service, it has been observed occasionally, that the readiness of miners to jeopardize their lives, after disasters, was not always so evident when they were asked to depend on the mercies of a rescue apparatus, which perhaps they had never worn before or which they had never used in actual mine-rescue work. They prefer to face a greater certainty of death with the natural unencumbered use of their limbs and lungs. To recall an old story, they do not essay to go out to battle in armor they have never tried. Furthermore, it is better they should not if more experienced men are obtainable.

Many a mine explosion kills off most of the trained men and as the rescue work must be done either in apparatus or in fresh air, the miners usually declare for the latter. There is in some regions a preference for this fresh-air work, because in such localities, mine fires and secondary explosions do not usually supervene. However, in the greater part of the United States, the risk of adding to the death roll by these methods cannot be overlooked. The mysterious second explosion at Brookside shows that even in the anthracite region a violent explosion may follow the first blast, though it would be a mistake to declare, in view of the peculiar circumstances and undetermined causes, that this second disaster would not have occurred had the fan been stopped while an exploration was made by men with breathing apparatus.

Because of the frequency of second explosions, the advocates of fresh-air rescue work must expect their claims to be disputed and disproved in most of our coal districts.

That being so, before we desire to sweep away federal and state institutions for mine-rescue work, we shall have to assume that at all disasters, men will be found ready not only to enter the mines but to put on breathing apparatus. There will always be men at every mine who will take a chance to save a comrade, and this statement will apply without contradiction, to every body of mine workers from Pennsylvania to Oregon and from Illinois to Texas. However, it is a fact that at some disasters, the local rescue men begin to wonder, when the time comes, whether their apparatus is in perfect condition, and they are prone to doubt whether the natural respiration can be advantageously supplemented by a mechanical contrivance.

Wales has numberless brave men and it has several excellent rescue stations with automobile rescue trucks. Yet at Senghenydd, the rescue work was done in fresh air by men trained in the use of breathing appliances and by others. The apparatus was not worn, at least in the bulk of the recovery work, yet that mine was the logical place to use them for the coal caught fire in several places.

No second explosion resulted, such as occurred at the Cadeby Main colliery, but the risks were there and dan-

gers are inseparable from such methods in mines which are gaseous, or where mine fires have been started and are ready to blaze up as soon as the air is renewed.

It is when there is a lack of local helmet men that regulars are needed who can rely on their breathing appliances, on their ability to wear them and who can be depended on to pass rightly on the condition of such apparatus as they find at the mine. As was remarked, "there is always a risk that some corporation driven by the law to buy appliances, will thrust them into some dark corner and leave them without proper attention, giving the men who should use them no training in their use."

This fact makes it probable that the rescue cars of state and nation are here to stay, though possibly they may in time serve only a secondary though quite a necessary line of defense.

Market Charts

Many students of economics assert that the trend of business and industrial activity moves in certain prescribed cycles. They maintain that the pendulum swings from a high to a low point at more or less well defined intervals. If this be true in a general way, then the same principle is of interest when applied to the coal markets, which are subject to annual seasonal fluctuations.

With this thought in mind, COAL AGE has devised a series of original charts for showing graphically, and at a glance, the exact status of the different conditions which combine to fix the market price of coal. The charts have been tested out for a number of months and have been so well received that it has been decided to increase their general scope and furnish those who are interested, with enlarged reproductions, suitable for wall charts.

There are three controlling influences which go to make the coal markets and for which exact and reliable figures are available. These are the temperature, the comparative price level, and the supply of railroad equipment. The last named condition enters into the problem only once during the year, as a rule; that is, in the fall, when forehanded consumers start laying in their winter's supply of coal and operations all over the country are being tuned up to full capacity.

Coincident with this condition of increased activity, the crop movement starts up in full blast and the railroads are soon facing the maximum load of the year. If, then, at this time of unusual transportation demands, a period of inclement weather sets in, interfering with the movement of trains, the situation often becomes acute and the market hinges entirely on car supply. To cover this phase closely, we publish a detailed statement of transportation conditions in all sections of the country, and also a chart which shows at a glance the exact condition of the gross car supply for the present year and the 12 months preceding. It should be noted in this connection that this is the only statement of this kind now published and confined entirely to the coal-car supply.

The close of the year of 1913 finds the coal trade facing what is commonly termed a "weather market." Complaints are general in all parts of the country regarding the abnormally mild temperature and, as a consequence, what had promised to be a buoyant fall trade, really developed into a situation where summer prices could scarcely be maintained. It might be argued in this connection that the difference in consumption between a severe and a mild winter is too meager to influence the market, and it is true that a competent authority in New York places the differential in consumption between a severe and easy winter at only 10 per cent.

However, it must be remembered that the difference is not only one of consumption, but of production and movement as well. Operations at the mines are often interfered with by adverse climatic conditions and, as is well known, the efficiency of the railroad service is always seriously crippled at such times, so that weather conditions become a prime factor in the situation. This is, therefore, an important consideration, and we are accordingly publishing charts, at intervals, showing the comparative mean weekly temperatures at three representative distributing centers, and three more will be added shortly.

The relative condition of the market as regards prices is also an important consideration when studying the current status of the trade. The competent sales agent, watching the trend of business closely, carries a well defined synopsis of the situation over the past year or two in his mind's eye, and is continually balancing present conditions against those in effect at the same time last year.

He knows that at a certain time in the fall, an advance in the prompt market may be reasonably expected and that a decline some time in the spring must inevitably follow. The exact time and range of these price variations are, as a rule, only vaguely fixed in his mind and are more or less subject to the vagaries of the human equation. To overcome this difficulty, we have compiled charts showing the comparative prices for the past two years, according to weekly quotations in COAL AGE.

This data is of value principally in a comparative sense, and not for the actual figures quoted. Unlike other commodities, the price of coal is subject to so many varying conditions that no standard quotations are available, but the figures given are standard in a comparative sense, since they are quoted under indentically the same conditions and by the same men. We believe them to be representative of a conservative market in every sense of the word, since they are fixed in an entirely impartial and unbiased manner.

The Scranton Situation

The present status of the mine-cave question in Scranton is proving no exception to the experience of the past, that time always temporizes men's feelings and hearts. Time amalgamates human interests.

The wisdom of the seeming indifference of the great coal corporations, whose capital and energy have cooperated to develop the natural resources of the city and its suburbs, is now beginning to appear to the progressive citizens of Scranton. The skies are brightening with the coming of the new year, which it is hoped will mark the dawn of a new era of prosperity for the anthracite city.

Mayor-elect Jermyn is a man whose precedents eminently qualify him to head the committee that will discuss with President Truesdale the interests of Scranton and her citizens.

Recent Legal Decisions

Assumption of Risk by Miner—A coal mine owner is not liable for injury to a miner caused by a falling rock, where the miner himself tested the rock before knocking a prop from under it, which action permitted it to fall. (Alabama Supreme Court, Adams vs. Corona Coal & Iron Co., 62 Southern Reporter 536.)

Avoidance of Settlement Made by Administrator—A settlement made by a miner's administrator of a claim of damages against the decendent's employer, arising from his death while at work, may be avoided by a beneficiary of the estate if it appears that the settlement was unfair (Kentucky Court of Appeals, New Bell Jellico Coal Company vs. Stewart's Administratrix, 159 Southwestern Reporter 962.)

When More Than One Certified Foreman Must Be Employed In Pennsylvania—The Pennsylvania Anthracite Mining Law requires a certified mine foreman to be placed in charge of each separate mine operated by a single company; it is not sufficient, when one company owns two disconnected mines, that an assistant foreman be placed in charge of one of them. (Pennsylvania Supreme Court, Janosky vs. Lehigh Valley Coal Co., 88 Atlantic Reporter 419.)

Employer's Liability—Measure of Damages—A miner injured while being lowered to his place of work, through a defect in the engine controlling movement of the cage, is entitled to recover such amount, as damages, as will presently compensate him for his past and future physical pain and loss of time, or diminished earning capacity, resulting from the accident. (Texas Court of Civil Appeals, Texas & Pacific Coal Co. vs. Choate, 159 Southwestern Reporter 1058.)

Accumulation of Coal on Track as "Dangerous Condition"—Accumulation of coal on a mine track, caused by its being raked off the cars on account of lowness of the roof of the entry, in such quantities as to cause derailment of the cars, is such "dangerous condition" as the law of Illinois requires the mine owner to guard against. Such law is not unconstitutional as constituting class legislation, since it applies to all mines similarly situated. (Illinois Supreme Court, Mengelkamp vs. Consolidated Coal Co., 102 Northeastern Reporter 756.)

Duty to Warn Mine Employee Against Danger—Although, in a suit against a coal company for injury to an employee, sustained while attending a winch wheel by having his arm caught between the wheel and a nearby steel bar, the question whether the employer was negligent in failing to give notice to the employee of the starting of the engine which operated the wheel is not to be determined by any custom of the employer to give or not to give such notice, it was not necessarily negligent to fail to give the notice, where the winch line was taut and the machinery was being operated; the injured employee not being a novice in the work. (Kentucky Court of Appeals, West Kentucky Coal Co. vs. Kelley, 159 Southwestern Reporter 1152.)

Responsibility for Company Physician's Negligence or Malpractice—Before a coal mining company will be held legally responsible for negligence or malpractice of a physician employed by it to treat its employees, it must appear that the company was negligent in selecting or retaining him. But if an employee has as full knowledge of the physician's incompetency as the employer and yet fails to complain against his retention by the company, the employee cannot recover against the employer on account of any damage resulting from negligent treatment at the doctor's hands. (West Virginia Supreme Court of Appeals, Guy vs. Lanark Fuel Co., 79 Southeastern Reporter 941.)

Liability for Injury to Miner—A verdict for $1250 was not excessive recovery against a coal mining company for physical suffering of a miner, preceding his death, resulting from his being crushed between a car on which he was riding and a prop set near the track, where the jury found that the company negligently failed to maintain the place in a reasonably safe condition. The jury were properly instructed that the company was not required to furnish an absolutely safe place of work, but that it was bound to use ordinary care to make the place reasonably safe; and that if the accident was caused by negligence in this respect, while the injured miner was in the exercise of ordinary care for his own safety, his administrator was entitled to recover (Kentucky Court of Appeals, West Kentucky Coal Company vs. Butler's Administrator, 159 Southwestern Reporter 958.)

Right to Enjoin Operation of Coal Washery—Suit will lie to enjoin operation of a business in such way as to injure the public health or comfort as where smoke or gas is emitted in offensive quantities. In determining what constitutes a nuisance of this kind, the particular surrounding circumstances must be taken into consideration, including the density of population, the character of the neighborhood as to occupancy for residential purposes, etc. But in this case, a suit to enjoin practices at defendant's coal washery, it was decided that the evidence was insufficient to show that a slack pile, smoldering from spontaneous combustion and emitting smoke and gas, constituted a nuisance, or that there was any public nuisance arising from the fact that water from the plant was cast into open drains. (Illinois Supreme Court, City of Pana vs. Central Washed Coal Co., 102 Northeastern Reporter 992.)

Illinois Safety Requirements—A miner who is injured while working under dangerous conditions, pursuant to orders from his superior, is entitled to recover the amount of his damage from his employer, if he used due care for his own safety, and the danger was not so obvious that a reasonable person would not have undertaken work in similar circumstances. Direction by an assistant mine manager, after inspecting a mine roof, to a miner to proceed with his work constitutes implied assurance that the roof is safe. The clause of the Illinois mining law which makes it unlawful for a miner to commence work without examining the roof over him, and until any dangerous condition has been obviated, except to make the place safe, applies only to miners who have fixed working places, and not to men who work all over the mine wherever fall of material from roofs may occur. (Illinois Supreme Court, Grannon vs. Douk Bros. Coal & Coke Co., 102 Northeastern Reporter 769.)

Railway Company's Liability for Failure to Furnish Cars—Although a statute in force in Kentucky requires railway companies to furnish cars to shippers on demand, the employees of a coal company cannot maintain suit to recover for loss of work, caused by a railway company's wrongful refusal to furnish cars to the coal company. (Kentucky Court of Appeals, Illinois Central Railroad Co. vs. Baker, 159 Southwestern Reporter 1169. The court said: "It may be true that this statute imposes upon the carrier the duty required for the benefit, in part, of the public, but the statute only becomes operative when some person having a contractual relation with the carrier has been injured by the breach of duty, and the right of recovery is confined to such person. In other words, the statutory duty, to be the basis of an action, under circumstances like those we are considering, must rest on a contract, expressed or implied, made between the complaining party and the carrier."

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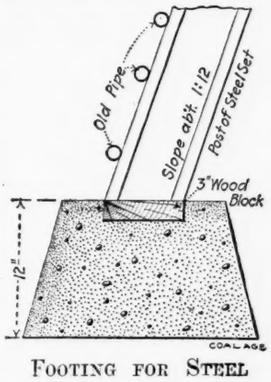
Some Susquehanna Methods

In using steel timber sets the Susquehanna Coal Co. at Nanticoke builds concrete bases for its posts but, in order not to render the support too unyielding, a wood block 3 in. thick is placed in the top of the concrete pedestal. When the weight comes on this wood filler it is often crushed till but 1 in. through. This takes up those changes in relative elevation of top and floor, which always take place on the commencement of mining. The lagging over and alongside the timber sets is usually of scrap pipe and when enough of this material is not obtainable, it is purchased elsewhere. Of course, this pipe lagging is supplemented in various ways by cross-lagging of rock or wood. The pressure is not sufficient to crush the pipe.



FOOTING FOR STEEL POST IN MINE SET

The Susquehanna Coal Co., on breasts at pitches varying from 10 deg. to 20 deg., is using concrete batteries built 2 ft. thick and 12 ft. wide, and they are giving perfect satisfaction. As a rule the breasts are only 4 yd. wide at the gangway and are not enlarged to 30 ft. till they are about 24 ft. long. But conditions are not quite uniform and some variation in practice is allowed.

DISCUSSION BY READERS

Working Coal under Sandstone Cover

Letter No. 4—I offer the following, in the hope that the suggestions may help W. N. Anderson and West Virginia Engineer, in the difficulties they described, COAL AGE, Nov. 15, p. 745.

The chief difficulty seems to be that the pillars are not sufficiently thick to support the roof pressure and permit of a high percentage of extraction of the coal. I submit the accompanying sketch (Fig. 1), showing a section of the mine only. It may be assumed that all of the work inby on this pair of entries and to the rise of the same has been completed and the pillars drawn. The figure shows the work in progress of drawing back the pillars in rooms 5 to 9, inclusive; while room No. 4 is shown as being driven through the barrier pillar that separates the faces of these rooms from the air course above.

The plan is to drive each room, successively, through this pillar, and then start the work of drawing back the

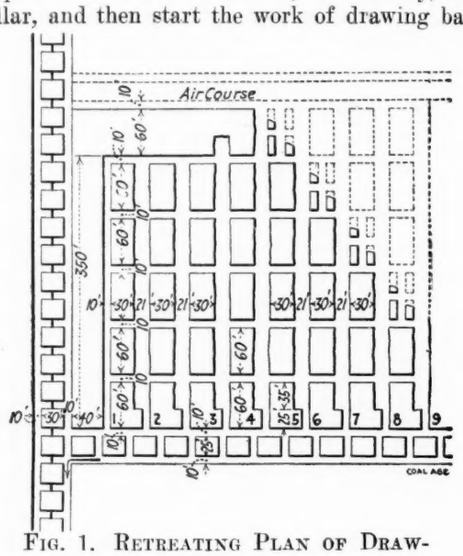


FIG. 1. RETREATING PLAN OF DRAWING PILLARS AND BARRIER

pillars from the lower rib of the air course. Before doing this, however, the upper block, in each pillar, which is 30x60 ft., is divided by driving a crosscut 10 ft. wide, through the center of the block. The upper and lower halves are then divided, in turn, by a similar heading, 12 ft. wide. The remaining four blocks into which the pillar is thus divided measure, each 9x25 ft. These smaller blocks are then taken out, in turn, starting at the upper inby corner. It may be necessary to stand props to prevent the falls from crowding the work on the pillars. This operation is repeated on each one of the blocks in succession, observing the precaution to keep the line of pillar work regular and to draw all timber so as to permit the roof to fall in the rear of the work.

In regard to the proposition stated by West Virginia Engineer, I would mine all coal by machines, provided the conditions permit. The rooms should be driven not more than 20 ft. wide to get the maximum amount of coal. These rooms should be driven on 80-ft. centers, so as to leave 60-ft. pillars between them, which should provide a sufficient support to prevent any heaving of the bottom.

In some instances, under similar conditions, the rooms are driven on 100-ft. centers, and the method has been working successfully for several years. From 95 to 96 per cent. of the coal is taken out. In any method of longwall, it is important to draw all timber, so as to allow the roof to settle uniformly on the gob. This applies, also, in drawing pillars in the room-and-pillar method. No stumps of coal must be left, to provide local surface support for buildings, as this is a false security and often results in greater damage than where all the coal is taken out.

WILLIAM D. ROBERTS.

Rock Forge, W. Va.

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Letter No. 5—Referring to the inquiries of W. N. Anderson and West Virginia Engineer, COAL AGE, Nov. 15, p. 745, in regard to working coal under sandstone roof with a soft bottom, I offer the following as being a good method to pursue in such a case:

Mr. Anderson states that the rooms are driven 21 ft wide, with 30-ft. pillars between them, giving 51-ft. centers; and adds that the rooms are protected above by a 60-ft. barrier pillar, which separates them from the next pair of entries. It is my belief that the room pillars are too small and there is too much open work in this case. The bottom will heave in spite of anything that can be done to prevent it.

Under these conditions, I would suggest retimbering the first five rooms before starting the work of drawing back the pillars. A board or foot-piece should be used under, instead of a cap on top of each prop. This footboard should be 3 in. thick and 12 in. wide by 3 ft. long. Then, start drawing back the pillars in these five rooms; and when the work has advanced a good distance and the bottom begins to heave badly on the road draw or shoot all the timber possible, so as to start a good fall of roof behind, which will relieve the weight on the pillars. It is important, however, to continue timbering the rooms back toward the entry.

In the mine where I am now employed, we had the same trouble. The top was a heavy sandstone, while the coal was underlaid with 2 in. of slate and from 6 to 10 in. of coal. A portion of this mine was old workings that had been standing for a considerable length of time. I found that the only method was to produce a good fall of roof, to accomplish which I often had to shoot all the timber standing in the places. This gave good results.

I would suggest that Mr. Anderson's rooms be driven (Fig. 2) on 60-ft. centers with 40-ft. pillars, making the rooms from 18 to 20 ft. wide. It would be better to leave a barrier pillar of 150 ft. and drive the cross-entries on 75-ft. centers. These cross-entries should be driven 200

ft. before any rooms are turned. The rooms could then be driven 400 ft. deep without producing any undue pressure on the pillars.

I have used this system with good success. When the first two rooms have reachel the limit, I would pull the track in the first room and start drawing back the pillar through room No. 2, continuing this as far back as the first crosscut in the rooms. This first crosscut was made 100 ft. from the entry. Since the West Virginia mining law requires crosscuts to be made at distances not to exceed 80 ft. apart, it was necessary here to build square packs of slate and dirt in the first five rooms. Before the first fall of sandstone occurred, I had arranged an

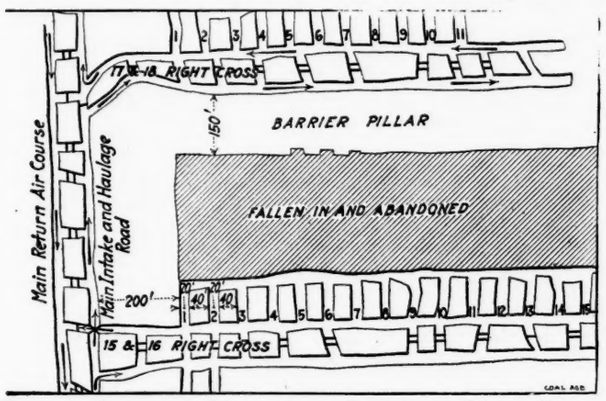

FIG. 2. PROPOSED METHOD OF BREAKING HARD SANDSTONE ROOF

opening in room No. 1, so as to ventilate the falls and prevent any accumulation of gas above them.

In regard to drawing back the barrier pillars, it was necessary to drive an opening or room 30 ft. in advance of the rooms turned off the entries, through which the work of drawing back the barrier was started. The entry or chain pillar, and the room stumps up to the break line were all drawn back together. A great saving of material is effected by drawing the track in the rooms, as the falls occur, and using the same in the rooms being driven.

JAMES H. HUGHES, Mine Foreman,
The American Coal Co.

Mannering, W. Va.

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Letter No. 6—Replying to Mr. Anderson's inquiry, in regard to working coal under a sandstone cover, I want to say that it is important to break the roof in order to relieve the pressure of the overburden on the pillars. To

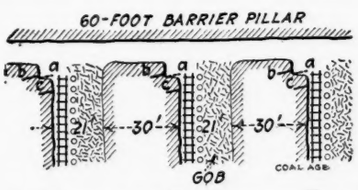

FIG. 3. METHOD OF EXTRACTING PILLARS

do this (Fig. 4) I would double shift the entire line of pillars and draw these back as rapidly as possible for a distance of, say 150 ft. This should start a break in the sandstone, but if one does not occur in this distance, drillholes should be put up in the roof, in a line parallel to the face. These holes should be 10 ft. deep and spaced a distance of 20 ft. apart. The holes should be charged and fired by a battery when the men are out of the mine.

When a break is once started, there will be no further trouble, but it will be necessary to keep the pillar work in line with the break and to protect the men with a double row of timbers or cogs. In the accompanying sketch, I have shown a section of the pillar work, with a track laid across the rooms and a double row of posts. The track must be shifted back following the work on the pillars. Each line of timbers should be drawn regularly and a new row of posts set. The posts, or "cogs" if necessary, should be set on a pile of slack or slate, so as to enable them to be removed readily; but if these should become wedged too tightly, they must be blown out with dynamite.

H. GEDOSH.

Poteau, Okla.

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Letter No. 7—In reply to the question of Mr. Anderson, on drawing back pillars under sandstone cover, I wish to say that the best method to adopt will be to draw these pillars back in line with each other, for if this is not done, those pillars that fall behind the rest will be subjected to a greater pressure than the others, and the coal will be crushed.

In my opinion, the work of drawing back the pillars should have been commenced as soon as each room reached the limit, but always leaving a stump of sufficient size to protect the entry. The work on each pillar should be

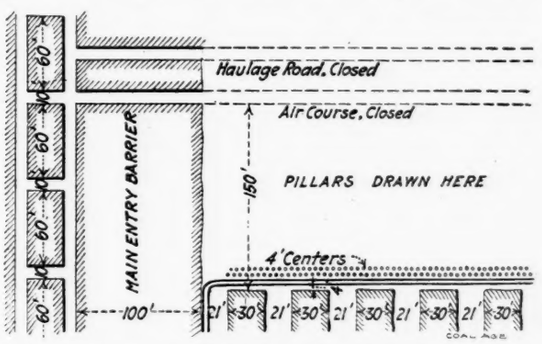


FIG. 4. PROPOSED METHOD OF DRAWING PILLARS

started by driving a crosscut at the face so as to leave a loose end. In Fig. 4, I have shown my plan of working the pillars in steps. I have used this method in drawing pillars in the lignite mines, at Alba, Texas, where I formerly worked.

In this plan, the shot *a* was first put in on the rib, about 6 ft. from the end of the pillar. This shot blew off the corner of the pillar, as shown. A second shot *b* is then put in, which blows off another piece on this skip, and this is continued across the width of the pillar. The coal is taken out on the track which runs close to the straight rib of the room. If possible, another track might be laid up the other side of the pillar by clearing the gob. This, however, will often be impracticable, and the coal must be taken out on the single track, as just mentioned. A row of posts is now set across the face to protect the end of the pillar, and a second skip is started by placing a shot at *c*. The work is continued across the pillar, as before, the coal being cleaned up and taken out on the

track, as mentioned. A second row of posts is now set across the face, after which the first row of posts may be removed.

If the roof does not break when the work has progressed a good distance, holes should be drilled in the roof and shots fired to start the break. In order to avoid the heaving of the bottom, larger pillars should have been left in the planning of this mine. It is best under such conditions to make the width of the pillar twice the width of the room.

Where the gob has not been filled tight to the roof, it may often be necessary to clear spaces at intervals in the gob and set heavy cribs or timbers to relieve the pressure on the pillars. If the roof coal has been left up in the first working it must be recovered when the props are knocked out or drawn.

JOSEPH JELINEK.

Newcastle, Texas.

Education and Training of Mining Men

Letter No. 5—Referring to the letter of Samson Smith, COAL AGE, Nov. 15, p. 743, I believe with him that boys ought to be taken into the mines and given a practical training in the different branches of mining work. Before this can be done, however, the boys should have a thorough school education and possess a knowledge of mine gases, ventilation, electricity, compressed air, and the general principles of mining and mining machinery. Mr. Smith refers to the many Scotch and English miners who are now the best mine foremen in this country today and who went into the mines when they were boys; but he must remember that the conditions in England, in this respect, are quite different from our conditions here.

Everyone acquainted with mining in this country knows that shiploads of men who have never seen the inside of a mine are being landed in New York every week, and these men come in large numbers to the mining districts and are put to work in the mines. I believe I express the sentiments of most mine bosses when I say we are pleased to see them, as we can generally place them with one of their own countrymen who will look after them and give them what they are worth for a few months, or until such time as they learn to look after themselves.

Owing to the large numbers of this class of labor, it becomes the duty of every mine foreman to educate these men in the best way he knows how. Unless he can speak a half dozen different languages, however, he must give them the instruction they need through the miner who employs them. I have always had much sympathy for men who do not understand the language or what is expected of them in the mine; but I have found the best means of educating them is through kindness.

We must be practical in all of our suggestions. It is of no use to assume conditions that do not exist in the mine, and lay out a plan, which we will find on going into the mine in the morning cannot be put into practice because there are men there of all nationalities, creeds and degrees of intelligence. One might as well discharge a man at once as to ask him to work with another of a different nationality.

The suggestion made by Mine Inspector Nesbitt that instructors be employed to go around the mine and show these men how to take care of themselves, would no doubt be a paying investment in many large mines. The suggestion is worthless, however, in respect to a mine running on a small margin of, perhaps, a cent per ton.

The principle is generally recognized that the more intelligent and efficient a workman becomes, the greater benefit he is to himself and his employer. If a brattice is to be put up or a switch to be laid, the mine foreman generally picks out a good worker of less experience and sends him along with an experienced bratticeman or tracklayer to do the job. In this way, the new-comer gains his experience and becomes more valuable to himself and his employer; but it frequently happens that as soon as a man has received his training in this way, he overestimates his ability and looks for work elsewhere. It is much the same with a coal digger. A greenhorn comes from the old country, gets a little experience in the mine, and soon makes up his mind that the coal is a little softer or the roof better in another mine, and he is gone. I believe that kindness and sympathy will do more to win and hold these men than anything else, as by this means we gain their confidence.

THOMAS HOGARTH.

Heilwood, Penn.

The Certificate Law

Letter No. 5—I have been interested in the discussion of the mine foreman's certificate, being made nation wide, as proposed by Mr. Dixon, COAL AGE, Oct. 25, p. 604. And I would like to say that I for one am entirely opposed to such a proposition.

Everyone who has been much around, knows the conditions are so varied that one examination can hardly cover the ground in a single state, and much less could it be made to meet the needs of different states. A man might successfully manage mines in some of the districts in this state, for example, and yet utterly fail in respect to safety in another state. Some mines have gas, dust, water, bad roof and dangerous quantities of blackdamp, while others have but one or two of these troubles to contend against, or perhaps are free from all of them.

Fancy a man, for instance, who has had charge of mines in the Clearfield region, but with no other experience, coming to take charge of the gaseous mines of West Virginia, or the mines on the Monongahela, or some of the mines in the Panhandle region. And what shall we say of the solid shooting in Illinois and Oklahoma, or the dusty mines of Colorado, or the broken roof and faulted conditions of the anthracite mines.

Perhaps there may be someone who is versatile enough to make an examination that would cover all of these regions, but that has not been my experience. I think such lowering of the bars would be a mistake. Surely, if any man wants to take a position in another state, he ought to have the ability to stand the examination in that state; and, as to the cost, that is a mere bagatelle.

I have stood examinations myself in different states and countries, and see no reason why others should not do the same. To my mind, safety is obtained by experience and training alone; and no one man's knowledge is broad enough to cover all the conditions of the different states without such training.

JOSEPH VIRGIN, Supt.

Moundsville, W. Va.

Letter No. 6—Referring to the recent interesting discussion of the mine foreman's certificate, I want to say, in my opinion, it would be of material benefit to the mining world if each man holding a certificate were called before an examining board, at least once every two years, and given such an examination as would enable the board to determine whether or not he is keeping abreast of the times.

It often happens that men by a brief study of mining books and from personal information are able to pass an examination, without having the all-essential experience that makes them fit to assume the duties and responsibilities of mine foreman. I could mention several men who hold mine-foreman certificates who cannot take a safety lamp apart, clean, fill and put it together again properly. They would not be able to ventilate a pair of entries without a room turned, to say nothing of ventilating the working faces of a large number of rooms. While this may seem a sweeping statement, it is a fact that can be confirmed; and although accidents will occur, at times, in mines in the charge of men who have had a life-long experience, they are not as frequent in such mines as in others where incompetent foremen are employed.

I hope to see the time come when every mine foreman who holds a certificate will be required to stand another examination at least once in four or six years. I am willing to take my chances with an intelligent examining board. I believe such a board should have power to revoke any certificate when the man who holds the same fails to come up to the standard of the examination. I agree fully with District Mine Inspector Rose, when he says that candidates should be examined every six years. Mr. Rose sounds the keynote to safety in mines, as far as the mine foreman is concerned.

I have in mind one man who never worked six months in a coal mine, but holds a first-class certificate. This man carries a safety lamp in the mine, but could not tell gas from sunshine. The same man has said that he carried the lamp so that the miners would think everything was all right, adding that "any fool can boss a coal mine." In view of some facts, I am almost forced to the same conclusion myself.

When I first took charge of the mines here I found a poor current of air traveling, largely caused by a door so placed as to choke the air current that was trying to find its way through the mine. This door was set by a man holding a first-class certificate. The question may be properly asked, "Who is to blame?" I say, Give me a man who has experience, as well as technical knowledge.

A. H. STANSBERRY, Mine Foreman,
Big Mountain Coal Mining Co.
Oliver Springs, Tenn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

GREATEST COMMON DIVISOR

The greatest common divisor of two or more numbers is the greatest number that will exactly divide each of them. The operation of finding the greatest common divisor depends on the following:

Principle—Any number that will exactly divide the difference of two numbers and one of them, will exactly divide the other also; and an exact divisor of a number is also an exact divisor of any multiple of that number.

The application of this principle gives the following:

Rule—Divide the greater number by the less. Then continue to divide the last divisor by the remainder till the division is exact. The last divisor is the greatest common divisor of the two original numbers.

If there are more than two numbers, however, find the greatest common divisor of two of the numbers, as explained and then find the same for that divisor and another of the numbers; and continue this operation till all the numbers are used. The last result is the greatest common divisor of the numbers.

Example—Find the greatest common divisor of 77 and 396.

Solution—

```
77 ) 396 ( 5
     385
     ---
 11 ) 77 ( 7
      77
      --
       0
```

Proof—

```
11 ) 77  396
      7   36
```

Therefore, 11 is the greatest number that will exactly divide both 77 and 396.

Example—Find the greatest common divisor of 42, 63 and 98.

Solution—

```
42 ) 63 ( 1          21 ) 98 ( 4
     42                   84
     --                   --
 21 ) 42 ( 2          14 ) 21 ( 1
      42                   14
      --                   --
       0                    7 ) 14 ( 2
                                14
                                --
                                 0
```

Proof—

```
7 ) 42  63  98
     6   9  14
```

Therefore, while 21 is thus shown to be the greatest common divisor of 42 and 63; 7 is found to be that of the three numbers 42, 63 and 98. In other words, 7 is the greatest number that will divide each of these without a remainder.

LEAST COMMON MULTIPLE

The least common multiple of two or more numbers is the least number that is exactly divisible by each of the given numbers. Thus, 24 is the least common multiple of 6 and 8; because it is the smallest number that is exactly divisible by both 6 and 8.

The Coal Age Pocket Book

Rule—Write the given numbers in line and divide successively by any prime number that will exactly divide any two of the numbers. The continued product of the several divisors and the remaining quotients or numbers is the least common multiple of all the numbers.

Example—Find the least common multiple of 24, 30, 54 and 150.

Solution—

```
2 ) 24  30  54  150
3 ) 12  15  27   75
5 )  4   5   9   25
     4   1   9    5
```

$$2 \times 3 \times 5 \times 4 \times 9 \times 5 = 5400$$

Proof—

$$5400 \div 24 = 225$$
$$5400 \div 30 = 180$$
$$5400 \div 54 = 100$$
$$5400 \div 150 = 36$$

CANCELLATION

In the solution of mathematical problems, it frequently happens that there are a number of factors involved as multipliers or divisors. In such cases, instead of performing each separate multiplication and division, the work is much shortened by writing all the multipliers in the numerator and all the divisors in the denominator of a compound fraction, and then proceeding to cancel all the factors common to both terms of the fraction. When this has been done the remaining factors of the numerator are multiplied together, as also those of the denominator, and the former product divided by the latter. An example will serve to illustrate the process.

Example—A certain mine produces 100,000 tons of coal in a year of 270 working days. In this mine, the average number of men employed was 150 and they worked 8 hr. a day. On this basis, what output may be expected from a mine employing an average force of 240 miners, who work 9 hr. a day, for a year of 210 working days?

Solution—Without reference to the use of ratio and proportion, to be explained later, it is necessary to divide the tonnage produced in the first mine, successively, by the number of men employed, the days they worked and the hours per day, to obtain the output per man per hour. Then, this multiplied, successively, by the same factors in respect to the second mine, will give the probable output for that mine.

Thus, $100{,}000 \div (150 \times 270 \times 8) = \frac{25}{54}$ tons per man, per hour. Finally, $\frac{25}{54} \times 240 \times 210 \times 9 = 140{,}000$ tons.

As previously stated, the work is much shortened by writing all the multipliers including the tonnage of the first mine, in the numerator and the divisors in the denominator of a compound fraction and canceling out common factors; thus,

$$\frac{100{,}000 \times \overset{8}{\cancel{240}} \times \overset{7}{\cancel{210}} \times \cancel{9}}{\underset{5}{\cancel{150}} \times \underset{\cancel{9}}{\cancel{270}} \times \cancel{8}} = \frac{700{,}000}{5} = 140{,}000 \text{ tons}$$

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What gases result from the explosion of dynamite?

Ans.—The products of the explosion of dynamite are carbon dioxide (CO_2), nitrous oxide (N_2O), nitrogen (N_2) and water vapor (H_2O). The reaction that takes place is represented by the equation:

$$2\,C_3H_5(NO_3)_3 = 6\,CO_2 + N_2O + 2\,N_2 + 5\,H_2O$$

Ques.—What gases are formed during a mine fire?

Ans.—The composition of the gases resulting from a mine fire will depend chiefly, if not wholly, on the quantity of air present. In a plentiful supply of air, the combustion will be more or less complete, producing carbon dioxide (CO_2). If the ventilation is slack, and the air supply insufficient for complete combustion, varying amounts of carbon monoxide (CO) and nitrogen (N_2) will be produced in addition to the carbon dioxide.

Ques.—If 20,000 cu.ft. of air and gas, at the maximum explosive point, is passing per minute through a mine, what is the quantity of gas given off and what quantity of air should be added to render the mixture nonexplosive?

Ans.—A firedamp mixture at its most explosive point contains 9.46 per cent. of gas (methane). The volume of gas carried in this air current or given off in the mine is, therefore, $20{,}000 \times 0.0946 = 1892$ cu.ft. per min. In order to render this volume of gas nonexplosive, it must be mixed with thirteen times its volume of air; or $13 \times 1892 = 24{,}596$, say 24,600 cu.ft. per min., which is the total volume of pure air in the current. The quantity of air to be added is, therefore, $24{,}600 - 20{,}000 = 4600$ cu.ft. per min.

Ques.—If a portion of a mine is worked with locked safety lamps and approved powder is used for blasting, how would you proceed to light the shots and what precautions would you take in performing this duty?

Ans.—Use none but an approved type of safety lamp. Having properly prepared and tested the lamp, ascertain that all of the men are out of the mine. Observe that the usual volume of air is in circulation. Proceed to the gaseous section of the mine and begin firing the shots on the end of the air, in this section first. With some possible few exceptions, fire only one shot at a time in a single working place, giving ample time for the smoke and gases to clear before firing succeeding shots. Advance thus in regular order against the air until all the shots are fired in this section of the mine. Follow the same general rule in the other sections of the mine. In every case, make a careful test for gas in the place and examine every shot before firing.

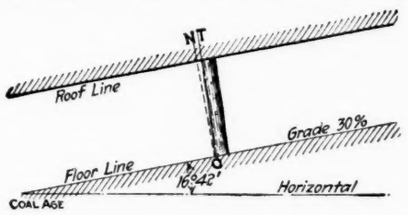
Ques.—What advantage is to be gained by turning the rooms at an angle with the entry?

Ans.—In flat seams, an advantage is often gained by turning the rooms in such a direction that they will cross certain clay slips or faults in the coal, or that the coal face will make a certain angle with the natural cleavage of the coal, so as to enable the coal to be worked "longhorn" or "shorthorn," according to requirements. The coal always works better when advantage is taken of these natural conditions.

In inclined seams, the levels, or gangways, are driven on the strike of the seam, allowing only sufficient grade to permit economical haulage and drainage. In moderate pitches, if the rooms are driven on the full pitch of the seam, the grade of the roads in the rooms will often be too great to enable the cars to be handled safely. This grade is reduced by driving the rooms across the pitch or at an angle with the entry.

Ques.—How would you set your timbers in an inclined seam and why?

Ans.—The posts should be set so as to lean slightly up the pitch, as shown in the accompanying figure. The pressure of the roof on the timber is exerted in a direction



STANDING TIMBER IN AN INCLINED SEAM

NO, normal or perpendicular to the seam. As the extraction of the coal proceeds, the roof has a tendency to slip downhill. If the post was set normal in the seam, or perpendicular to the roof and floor, the slipping of the roof downhill would loosen it, and it would fall out; but when the post is "upset," or inclined up the pitch, as shown in the figure, any movement of the roof downhill will tend to tighten the post.

Ques.—What are the advantages of driving rooms on sights, and how would you keep rooms straight without sights?

Ans.—The advantage of driving on sights is that all the rooms then keep the same general direction and the width of the room pillars is maintained uniform; or, in other words, the rooms do not "hole" into each other. When no sights are used, the miner keeps his direction by sighting back along the rail.

Ques.—What is a squeeze?

Ans.—A squeeze, in coal mining, is the effect produced by the overburden settling down heavily on the supporting pillars in the mine. The effect is indicated, in greater or less degree, by the sagging of the roof, the crushing of the pillars, or the heaving of the floor, or any or all of these combined.

Ques.—What method or means is most effective in arresting the progress of a squeeze?

Ans.—When a squeeze has attained any headway, its progress can only be arrested by causing a heavy fall of roof, by drawing all pillars and timbers over a considerable area, which has the effect to overarch the weight resting on the pillars, causing it to rest on the waste.

COAL AND COKE NEWS

Washington, D. C.

Attorney-General McReynolds has prepared a report for the year 1913 which was made public on Dec. 9 and in which he gives the most uptodate and thorough data yet available with respect to the coal cases prosecuted by the Department of Justice under the anti trust and other laws.

Mr. McReynolds first deals with the subject historically, and reviews the anthracite coal case, saying in part:

"It was held (1) that the defendants including most of the anthracite coal carrying railroads and affiliated coal companies were unlawfully combined in restraint of trade through the instrumentality of the Temple Iron Co., whose stock they owned in agreed proportions, and through which they purchased a number of independent mines and prevented the construction of an independent railroad; (2) that the system of agreements known as 65 per cent. contracts, by which the defendants acquired control of the independent output, were in restraint of trade.

The decree enjoined the defendants from voting or receiving the dividends on the stock of the Temple Iron Co., or otherwise attempting to exercise any control over it, and canceled the 65 per cent. contract. A general charge that the defendants were engaged in a combination in restraint of trade was dismissed. The charges against separate groups of the defendants, namely, (1) the Reading Co. and affiliated corporations, (2) the Lehigh Valley R.R. Co., and affiliated corporations, and (3) the Erie R.R. Co., and affiliated corporations, were not determined but were left to be dealt with in separate proceedings."

The Attorney-General then takes up the status of other cases and refers particularly to the case of the United States vs. the American Coal Products Co., in which a decree was entered by consent on Mar. 4, 1913, and the case of the United States vs. the Reading Co., et al. in which a petition was filed Sept. 2, 1913, against a combination consisting of the Reading Co., and affiliated corporations, charging it with restraining and monopolizing trade in anthracite coal, in which the defendants have only recently answered. As to cases under the commodities clause, Mr. McReynolds says:

In the United States vs. the Delaware & Hudson Co. the Supreme Court construed the commodities clause as prohibiting a railroad from transporting articles in which at the time of transportation it has any interest, direct or indirect, in a legal or equitable sense * * * in a later case the Court held that if the corporation owning the articles transported by the railroad was so completely identical with the railroad as to be but an arm of the railroad then the railroad would have an interest in the articles in the sense of the statute just as if the railroad held a title to the articles in its own name.

It is to be observed that under this construction the statute is not violated unless the railroad has the required interest in the articles at the time of transportation. It may have been the producer of the articles but if it parted with the title before transporting them it does not violate the act of Congress.

Thinking to bring themselves within this construction of the act the following plan has been devised: A railroad company engaged in mining coal either directly or through a controlled corporation which is but a part of itself will organize a new corporation, the stock of which will be distributed rateably among the stockholders of the railroad; whereupon the railroad will sell to the new corporation at the mouth of the mines its production of coal. This plan has been challenged in the case now pending in the district of New Jersey against the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co., the contention of the Government being that a corporation after all is but an association of persons and that under this plan the same association of persons which mines the coal transports it, and that therefore such transportation is a violation of the act of Congress.

Coal Inspection and Analysis

Another in the long series of bills introduced for the control of the coal mining and selling industry has been offered by Representative Treadway of Massachusetts and is a plan for the inspecting and analyzing of coal, the results to be furnished to purchasers. The alleged purpose of the bill is to prevent sales of inferior coal possessing an unduly small number of heat units from being made to individuals Mr. Treadway's plan is to have the Government apply the same methods of analysis which are employed in the army and navy where the British thermal unit system is adopted in order that the purchasers may be informed whether they are getting the coal that is represented or not.

Mr. Treadway says that the coal of ordinary use is the most general and necessary commodity of everyday consumption and that the consumer ought to be able to know in the same way and for the same reasons that he is informed concerning the constituent elements of foods, of the real nature of the fuel he obtains.

It is thought that the Bureau of Mines might be entrusted with the task of thus sampling and certificating the coal which is to be subjected to analysis. The bill will be taken up by the House Committee on Interstate Commerce and its consideration will probably be bunched with that of a multitude of other coal bills introduced last session and this, that are now pending before the Committee.

Probable Action on Alaskan Railway

The general examination of the outlook for the Alaska Railroad bill has given rise to confident prediction that the Senate will act on that measure at an early date and will provide an appropriation of at least $35,000,000 to be expended by the President in the construction of the desired roads in Alaska locating them in such a way as to open up the coal fields of the territory.

Senator Pittman of Nevada who is attempting to further the progress of the bill asserts that it will pass shortly and that in his judgment the measure will mean a saving of $1,000,000 a year to the Government in its purchases while it will also open large fields of other minerals.

HARRISBURG, PENN.

Auditor General Powell is getting ready to proceed with the collection of the state tax on anthracite coal, provided for by the act of 1913, and all producers will be required to make a statement of their output at the end of the present year.

The department will send bills for the amount of the tax based on the returns made by the operators, who are required to make reports under oath, and it is expected that a test of the constitutionality of the act will be inaugurated without much loss of time by the coal operators. Next year the state will not have the proceeds from one-fourth of personal property tax as an item of income. This amounted to about $1,300,000 this year, and it was the idea of the Legislature that the state's share of the coal tax would make this up. According to reports received, some operators have been charging the tax on their bills of sale of coal.

A systematic inventory of the water and water-power resources of the state of Pennsylvania is being discussed by the Water Supply Commission, and it is the plan to cover every stream in the state and to prepare for the people a list of all streams, their flow, the horsepower and other data. This will be a movement toward conservation and for the retention by the state of the water power now going to waste in many localities.

The commission has been chary about approving applications for charters for power companies in the last two years and only a few big water-power projects have been granted letters patent. Others have been so restricted that but little has been done toward putting them into operation.

This move by the state will no doubt help many coal companies who suffer several months of the year for water, and which many of the progressive companies are guarding themselves against by erecting large tanks and by building reservoirs.

Officers of the U. M. W. of A. are protesting to the operators against cutting coal and loading the same on Sundays, stating that hereafter the work will not be performed.

It seems that men employed in the strippings have been compelled to load coal on Sunday. They claim there is no necessity for doing this. They will agree to perform any necessary labor on the Sabbath so as not to interfere with prompt operations on Monday morning, but loading coal they assert is an abuse of rights.

They point out the fact that even during slack time in the coal trade men are compelled to work on Sunday and are laid off on days that the breakers are idle.

State Chief of the Dept. of Mines, Jas. E. Roderick, is taking steps to secure precautions against accidents in the mines of the state by issuance of stringent regulations in mines and instructions to inspectors to see that they are enforced. Every mine is being covered.

Union Organizers Have Been Busy

Field organizers of the United Mine Workers of America have been busy in District No. 2 (bituminous region) during the past several months, and the result is that the union is stronger, both numerically and financially.

At a number of the mines throughout the district, especially in Clearfield and Jefferson Counties, "closed shop" which means that only members of the union will be given employment, has been established, and great efforts are being made to make the organization as strong as possible so that the men will be in a position to present the strongest possible case, when they meet in convention at Dubois in March for the purpose of entering upon a two-years' wage agreement.

Indiana County has been the weakest county in the district, so far as membership is concerned, and an effort is being made to unionize the mines there.

If there is any opposition to the work of the U. M. W. of A. on the part of the operators it is not apparent on the surface. It is the contention of some of the operators that they have better success in the operation of their mines when they deal with the union than when they endeavor to make individual agreements with the men. Both the operators and the men are making preparations for the best possible working agreement when they meet in joint convention to Dubois in March.

There are four important demands which the miners will make at the joint conference. They will ask that the system of pushing cars to and from working places to the entries by the miners be abolished; a uniform day wage scale for all labor inside and outside the mines; a more strict rule enforcing the eight-hour day, and an eight-hour day for all engineers and firemen. There may be other demands made by the miners, but it is intimated that the men will insist upon those four things going into the next wage agreement.

The members of the United Mine Workers throughout the state are making arrangements to send delegates to attend the convention of the organization to be held at Indianapolis on Jan. 20. This is the 24th convention, the meetings having been held annually heretofore, but are now being convened biannually, so as to come in the January before the March on which the two-years' wage contracts entered into with the operators expire. The wage agreements in every mining district on the American Continent, between the United Mine Workers of America and the operators, expire in March next, except the new agreements recently made in West Virginia and the anthracite region of Pennsylvania.

PENNSYLVANIA

Anthracite

Lykens—The school boards of Lykens and Wiconisco are considering a proposition to start a night school for the people of the two towns. The activity in this line is the direct result of the formation of the Miners' Institute several weeks ago. Mr. Aulman, superintendent of the mines and Mr. Kutzner, mining engineer at the mines, both members of the institute served as a committee to meet the board.

Tamaqua—All employees of the Lehigh Coal & Navigation Co. in the Panther Creek Valley, with the exception of those at the Nesquehoning colliery and the washeries, recently went on strike as the result of a new order issued by the company. Heretofore, inside men have worked from 7 a.m. to 4 p.m., without a noon hour, for a day's work, while under the new order the company desires all employees to take 45 minutes off for lunch and end the day at 4:45 p.m. working the same hours per day, but meaning a later quit for the men.

Old Forge—The deal which has been pending for some time past for the purchase of the Sibley Colliery of the Elliott-McClure Co. by the Pennsylvania Coal Co., has been closed, and the latter company has assumed charge of the operation. The colliery is located in Old Forge, and the tract is of about 350 acres, three veins, the Red Ash, Clark and New County, being mined. Shortly after the change in ownership the employees went on strike, claiming that when the grievance committee of the union started to examine the due cards, the officials of the company ordered them to stop.

Scranton—Residents of the Green Ridge section of Scranton, aroused by the danger of mine caves and the failure of the coal companies to provide relief, have passed a resolution that a petition be sent from the residents of Scranton and vicinity, to Governor Tener, requesting the condemnation of all coal lands in Lackawanna County. It is generally understood throughout that section that what the property owners desire is that the State of Pennsylvania take over all coal lands and operate them, thus displacing the companies and officials about whom the people complain.

Plains—Residents in the vicinity of Henry St., between Merritt and William Sts., Plains, are becoming frightened at the number of cracks appearing in the surface in that vicinity, and in the concrete foundations of several houses nearby, caused by mine settlings. The Madeira-Hill Co. and the Delaware & Hudson Co. have coal lands in this section.

The miners at the Madeira colliery of the Wilkes-Barre Coal Co., who have been on strike, have decided to return to work pending an adjustment of their grievances. The men claim that under the schedule of rates in force between them and the company, for the removal of fire clay from the Ross vein $1.21 per yard should be paid. The section of the vein now being worked does not contain clay, but there is a stratum of rock which must be removed. The men claim they should be paid the same for removing the rock as for the clay, but this the company refuses to do.

Bituminous

Nanty Glo—The mines of the Springfield Coal Co., which were closed recently through the destruction of the boiler house and tipple by fire, have resumed operations. Repairs have been completed and the company starts again with better equipment than previously.

Conemaugh—The Park Hill Coal Co., which is driving a slope into the "C" coal vein, is taking out about 3 ft. of fine grade limestone in the process. The stone is being removed principally to furnish room for the headings, but the material is a valuable byproduct, as it can be used for several purposes, notably ballasting of tracks, in the blast furnace, and on the new state highway. The output of the new mine is about 500 tons a day at a minimum, with an ultimate capacity far in excess to that figure, when the company taps the "B" coal seam, as is planned later. Three shifts will be kept busy in development work for some time.

Morrisdale—The Morrisdale Coal Co. has disposed of its electrical plant to the Penn Service Co. and is paying the electrical plant for the power used to operate the mines.

Dubois—About 800 miners employed at the Eriton mines, of the Northwestern Mining and Exchange Co., are on strike, tying up the mines. The trouble is that the men insist upon the "closed shop." At the time of the walk-out, all of the employees, with the exception of four, were members of the union.

Pittsburgh—On Dec. 7 Judge Buffington, of the U. S. Circuit Court, granted a receivership to the Pittsburgh-Buffalo Coal Co., one of the largest independent coal concerns operating in the Pittsburgh district. This action was taken upon the petition of F. R. Babcock, J. W. Ailes, and John H. Jones, of Pittsburgh. At the same time Judge Dayton, of the U. S. District Court at Philippi, W. Va., granted the petition of the same men for a receivership for the Four States Coal & Coke Co. The Pittsburgh-Buffalo Co. operates properties at Marianna, Canonsburg, Burgettstown, and Bruceton, while the latter firm operates mining properties in the Mannington and Cabin Creek districts of West Virginia.

WEST VIRGINIA

Charleston—According to a report of the mine department of the state, there are 70,321 miners employed in West Virginia mines. Of this number 36,612 are of American descent, 14,000 are negroes, and 23,709 foreigners, of whom the majority are Italians.

It is the general opinion here that the 50 million dollar coal deal in the New River field will be consummated shortly. It is said that 85 per cent. of the owners and operators in the New River field have verbally agreed to the conditions imposed by the English syndicate. It is the desire of the purchasers that all operators in the New River field join them, and 50 million dollars in gold will be paid between the time the contracts are delivered, and June 1. This price is to cover operations and coal lands in Fayette, Raleigh, Greenbrier and Nicholas Counties.

Huntington—Arrangements for the employment of a large number of men to work in the mines of the Marmet Coal Co., near Marmet, W. Va., is being made by officials of that firm. Improvements are to be made by this company including the building of boarding houses to be constructed for the use of the laborers to be employed. Application has been made to the municipal employment bureau for both mine and other labor, and it is understood that a large number of men will be put to work about the first of the year.

TENNESSEE

Spring City—Col. George Wilkinson, of Philadelphia, Penn., is reported to be planning the purchase of a large acreage of mineral land in the vicinity of Spring City, Tenn., for immediate development, the work proposed including the operation of coal and other mines, the construction of coke ovens and a byproducts plant, the ultimate investment contemplated being in the neighborhood of $3,000,000.

KENTUCKY

Sebree—The Sebree Coal Mining Co. is planning to increase the capacity of its mine, installing a line of modern machinery. Lee Stone is manager of the company.

Sturgis—The West Kentucky Coal Co. is said to be working its nine plants to capacity, notwithstanding the fact that the mild weather and a short car supply have handicapped operations to a considerable extent. The company, which is the largest in the western Kentucky field, is planning still further development work, which will cost between $400,000 and $500,000.

Barbourville—It is understood that the Smith-Riley Coal Co., recently incorporated, has acquired a plant in this vicinity which is already in active operation, and that it will open up other mines shortly.

OHIO

Columbus—Coal operators, at least a few of them in Ohio, are taking up the agitation to secure the passage of a law, similar to that of Canada which is designed to prevent harmful strikes in all lines of business. In the coal mining industry the danger of strikes is one of the worst features to contend with. The Canadian law provides that neither can the employee strike or the employer lock out his men, until 30 days after the controversy arose and only then after the arbitration commission has made every effort to secure a compromise and when all of the facts in the case are published. The law takes into account three parties to every labor controversy, viz.; the employer, the employee and the public. It is believed such a bill will be introduced in the coming session of the Ohio General Assembly.

New Philadelphia—Suit has been brought in the courts of Tuscrawas County by the Goshen Coal Co. against the Royal Goshen Coal Co. to collect $12,957.56 alleged to be due for coal illegally mined under the property of the plaintiff. The two properties adjoin each other in Goshen Township in Tuscrawas County.

Murray City—State Mine Inspector J. C. Davies accompanied by several of his deputies has opened Pittsburg Mine No. 8, which was sealed up last March because of a fire. The fire was found to be out and the mine will be placed in operation soon.

INDIANA

Linton—The new Summit-Linton mine, employing 200 men, is expected to be in operation the first of the year.

Sullivan—The old Shelburn mine, working vein No. 5, caved in recently, breaking the props and covering the tracks, making it necessary to abandon it. About five acres of land sank. The mine had had trouble with gas. The Citizens mine will be reopened about Christmas. A new tipple is being built. The shaft has been leased to J. R. Risher. It was formerly the property of the Monon Coal Co.

The last pay day to the miners in this vicinity brought them $20,000. Prospects are said to be good for steady work for the next six months. Miners at the Glendora drew $4500; at the Union, $5000, and at the Paxton, $5600, the balance being distributed among the smaller mines.

Indianapolis—The miners' washhouse law, passed by the last Indiana legislature, has been held constitutional by the supreme court of the state, but was appealed to the United States Supreme Court, where it is pending.

ILLINOIS

West Frankfort—The Chicago, Wilmington & Vermillion Coal Co. is commencing to produce coal at its new mine at Orient, north of here. The producing company has built a small sized town so as to have its miners right on the ground and reports have it that Orient is one of the latest and most sanitary and comfortable mining settlements in southern Illinois.

The new mine of the Old Ben Coal Co., formerly the Buchanan Coal Co., is down to coal. This new shaft is being sunk southeast of this place in a coal field that has never yet been touched, and it is understood that the coal shows up considerably better in quality than that from the field west of here.

Royalton—The Chicago, Burlington & Quincy R.R. has completed its branch to this point, and coal is now being loaded out from the mine of the Franklin Coal & Coke Co.

Marion—The White Ash mine, which has been abandoned and allowed to fill up with water at White Ash, three miles north of here, is being pumped out, and all the mining material such as rails, cars, etc., will be removed and the mine abandoned and sealed up. It is also understood that the tipple and washer are to be offered for sale to be torn down and removed.

Edwardsville—The Henrietta mine, which cost $65,000 to sink, has been sold for the second time for a price that would indicate that it was not worth even junk money. In August, 1912, the Federal Trust Co. bought it for 45c. and assumed a debt of $11,500. It was operated for a short time at a loss and was leased to W. S. Walker, who also operated it and failed, owing the miners several thousand dollars wages. The last sale is to Mrs. Philipina Kraft, of East St. Louis, and the records show that she paid $1 for it. However, it is understood that included in the deal was some real estate in St. Louis valued at $30,000.

A small local mine, operated by the City Coal Co., is being flooded by a stream from a nearby creek through a fissure in the air shaft. The mine inspector has ordered the mine closed.

ARKANSAS

Spadra—The West Spadra Coal Co., which has been sinking a new shaft for several months, has finally struck a 4-ft. vein at a depth of 245 ft. The coal is pronounced of superior quality.

Hartford—The strike which has been in effect for some time at mine No. 4 of the Central Coal & Coke Co., has been settled and the men returned to work on Dec. 1. The miners' contentions that a guard be placed at the fan house during the entire time the men were at work, has been granted by the operators.

Clarksville—The Sterling Anthracite Coal Co.'s property here has been ordered shut down on account of poor ventilation. This is one of the largest mines in Johnson County and has been employing non-union men.

OKLAHOMA

McCurtain—There is a probability that the mine of the Sans Bois Coal Co., which was the scene of a disastrous explosion several months ago in which 70 lives were lost, will soon resume operations. The mine has been closed since the disaster, and the company has gone into the hands of a receiver; but it is believed that operations will soon be resumed.

COLORADO

Trinidad—Workmen from outside districts are now arriving in considerable numbers to take the places of the striking miners in the southern Colorado fields. These are, for the most part, convoyed from the trains to the mines by military escorts.

Denver—The acquisition and operation of municipal coal mines suggested by the City Council to combat high fuel prices is entirely practical, but not demanded immediately. Such was the report rendered by the Public Utility Commission, following an investigation requested by the council into the advisability of such a proposition. It is the opinion of the Commission, however, that coal should cost considerably less in Denver than the prices now charged.

FOREIGN NEWS

Juneau, Alaska—The land office at Juneau recently decided that 21 coal claims of the so called McAlpine Group of 200 on Cooks Inlet should be held for cancellation because of fraud. The Promotors of the McAlpine Group were indicted in Detroit on Mar. 6, 1911, for a conspiracy to defraud the United States.

Cardiff, Wales—Fifteen thousand coal miners in southern Wales were thrown out of work Dec. 4 by the strike of engine drivers and stokers on the Great Western Ry. All traffic on the Welsh branch of the line was disturbed. Leaders of the strike, which began through the dismissal of an engineer for refusing to handle Irish freight, are trying to extend it to other lines.

PERSONALS

L. C. Crewe, general manager of the La Follette Iron Co., has been on a trip during the past week to Knoxville and Chattanooga, Tenn., and Birmingham, Ala.

Col. Harvey M. La Follette, president and general manager of the La Follette Coal, Iron and Railway Co., has been spending some time in New York on business for his firm.

A. P. Goedecke, for 28 years general outside superintendent for G. B. Markle Co., at Jeddo, has resigned, and will leave the service of the company on Dec. 20. His successor has not been named.

George Hartshorne, formerly fire-boss in the mines of the Atlantic Coal Co., of Boswell, Penn., has been promoted to the position of mine foreman, while George Watson, formerly fire-boss in the same mine, has been promoted to the position of ass't mine foreman.

Hywel Davies, formerly of Louisville, but now residing in Lexington, Ky., who is well known among operators in Kentucky, being president of the Kentucky Mine Owners' Association, recently resigned as a member of the board of trustees of the Kentucky State University.

Mrs. Sophia Coxe, widow of Eckley B. Coxe, is preparing again to make happy the 3000 children of the miners at the Coxe Brothers & Co. operations (now owned by L. V. Coal Co.) by distributing gifts of clothing, toys and sweets among them the day before Christmas, as has been her custom for nearly half a century.

George P. Lindsay, of Plymouth, secretary of the Parrish Coal Co. for many years prior to the merging of that corporation with the Lehigh & Wilkes-Barre Coal Co., has leased from the Turner Estate a tract of coal land about 25 acres in extent, near the old Jersey mine in Plymouth Township, and arrangements are now being made to develop the tract.

Stephen J. Hammon has recently been appointed superintendent of the Dorrance, Prospect and Henry E. collieries of the Lehigh Valley Coal Co., at Wilkes-Barre, Penn., to fill the vacancy caused by the death of Joseph Jones. Sheldon Jones has been appointed to fill the place formerly occupied by Mr. Hammond, as superintendent of the Franklin and Warrior Run collieries.

Elmer O. Long has tendered his resignation as assistant chief engineer of the Consolidation Coal Co., at Somerset, Penn., to engage in a private engineering partnership with Frank B. Fluck. The new concern will be known as Fluck & Long, with offices in Somerset. While they will carry on all kinds of engineering they will make a specialty of examination and reports on coal-mining properties, installation of coal-mining plants, and municipal work.

F. G. Tice, one of the best known coal men in the Appalachian District, recently resigned as general sales manager of the Carter Coal Co., of Johnson, Tenn., and will move to Colorado. This step was taken on account of the state of his wife's health. He will probably form a connection with some operating company in the Colorado field. Mr. Tice has been in the coal business for years, having been connected formerly with the East Jellico Coal Co., later becoming general manager of the Interstate Coal Co., which was acquired by the Carter Coal Co., with which he has since been associated.

CONSTRUCTION NEWS

Nanticoke, Penn.—Contractor Charles Breeme, of Wilkes-Barre, is at present at work on the new boiler houses that are being erected by the Susquehanna Coal Co. at the No. 7 Colliery.

Martins Ferry, Ohio—Work was started recently on the extensive improvements at the Webb Mine by the Pennsylvania R.R. and will continue for several months. This work includes moving the tracks at that place and changing the channel of Wegee Creek to accommodate the output of the new mine. A number of company houses have been erected at this mine during the summer and a force of men is now at work erecting the steel tipple.

Huntington, W. Va.—It has been announced that a firm to be known as the Ohio Valley Co., will shortly install an electric power plant at Logan, W. Va. Power lines will be laid over the entire Logan coal field, and will be run up and down the Guyan River, Main Island Creek, Buffalo and Dingess Runs. The plant will ultimately be of 30,000 kw. capacity composed of turbine units of 5000 kw. each. It is expected that work will be started upon this plant within three weeks.

Barbourville, Ky.—For some time past there have been persistent reports of a new coal railroad to be built in Tennessee or Kentucky for the purpose of connecting some extensive properties near Barbourville with the Louisville & Nashvile R.R. at Beattyville, a distance of about 65 miles. As the result of a recent conference between the parties interested considerable progress was made toward active operation. The new road will traverse one or two counties which have no railroads at present.

Bluefield, W. Va.—Aside from the erection of the gigantic power house at Bluestone Junction, which is now under construction for the purpose of supplying current for the electrification of the Norfolk & Western R.R. between Bluefield and East Vivian, it is understood that the erection of another building is contemplated which will be used for a machine shop and car barn combined. Nothing definite has as yet been made known regarding this latter structure, but a building of this kind will necessarily have to be erected at some point along the line between the two towns.

NEW INCORPORATIONS

Portage, Penn.—The Martins Branch Coal Mining Co., of Portage, has been organized with a capital stock of $20,000.

Pittsburgh, Penn.—The Pittsburgh-Syracuse Coal Mining Co., of Pittsburgh, has been incorporated with a capital stock of $50,000.

Barbourville, Ky.—The Smith-Riley Coal Co. has been formed by local coal men to operate the Blue Gem mine in the vicinity of this city. A plant already established has been taken over by the new organization.

Columbus, Ohio—The John M. Taylor Coal Co. has been organized at Columbus for the purpose of mining and dealing in coal. The capital stock is $45,000, and the incorporators are John M. Taylor, John W. Moore, J. E. Ridenour, E. G. Thornton, and E. E. Learned.

Charleston, W. Va.—The Bengal Coal Co. has been incorporated with an authorized capital stock of $100,000. The incorporators are E. P. Hopkins, A. E. Morgan, W. H. Cunningham, T. F. Bailey, Jr., and Frank Enslow, all of Huntington. The offices will be in Huntington, and the chief works, in the Triadelphia district.

INDUSTRIAL NEWS

Newcastle, South Wales—The coal exports from Newcastle, South Wales, for the first nine months of 1913 were 3,786,432 tons valued at $9,645,727, increases of 166,756 tons, and $409,625 respectively.

McKinney, Tex.—E. G. and S. E. King of this city have closed the deal exchanging their coal mine at Como, Texas, to D. M. Lovelace of Oklahoma City, for a plantation in Mississippi and $75,000 in cash.

Pittsburgh, Penn.—The Secretary of the Treasury has recommended the appropriation of $762,000 for the Bureau of Mines. Of this $10,000 is wanted for the steam and electric equipments of the Pittsburgh testing station.

Bluefield, W. Va.—Local railroad men say that Dec. 3 was one of the busiest days in the history of the Pocahontas division. Practically every engine and every crew in Bluefield were mustered into service to assist in moving the heavy tonnage out of the field east bound.

Hebron, N. D.—The Lignite Briquetting Plant operated here by the state was destroyed about midnight, Dec. 3, with a loss of $10,000 by fire of an unknown origin. The destruction of this plant will seriously hamper the state's investigation into the possibilities of lignite.

Springfield, Ill.—Trouble which threatened to result in a general strike in the Peabody coal mines in this vicinity has been amicably settled. A strike of miners at the Peabody No. 8 mine at Kincaid, resulting from a disagreement over the wage scale, caused the trouble.

Uniontown, Penn.—It is reported that a company is to be formed by the owners of the Youngstown Sheet and Tube Co., to operate the large coal area in Green County, Penn., recently purchased by the latter company. The new firm will be known as the Buckeye Coal Co., and it is the intention to start the manufacture of coke to be used in the plants of the Youngstown Sheet and Tube Co.

Martins Ferry, Ohio—Although many boats are still operating on the lakes, little coal is being shipped. As a result coal companies are contracting for vessels to be used for storage purposes during the winter. Operators figure that regardless of whether there is a suspension or strike next spring when the wage scale agreement is to be taken up, they will have a long shut-down to face. Accordingly, they are obtaining leases on boats and will load them this winter at the docks.

COAL TRADE REVIEWS

GENERAL REVIEW

Markets generally steadier as a result of the change in weather conditions. Anthracite stocks low and an active market expected. Bituminous production curtailed. Prices ruling steady to firm, but trade dull and shipments on contracts slowing up.

The customary order of business in anthracite has been greatly demoralized by the unseasonable weather, but lower temperatures the first of the current week had a steadying effect upon the situation. As a rule the market has been remarkably well maintained, but it was becoming evident that a continuance of unseasonable climatic conditions would soon necessitate a curtailment in production, a most unusual procedure in hard coal at this period of the year. The final general adoption, by practically all the companies, of an increase in the circular to cover the new Pennsylvania State tax on hard coal, has put business on a more equitable basis. It is clear that stocks on hand are meager and it will not take much cold weather to create an active situation.

The bituminous market continues listless, with an entire absence of new business apparent on all sides, and the price list softening. The well stocked condition of consumers generally has removed any fear of an immediate shortage, so that contract demand is lighter. However, the situation is by no means as serious as might have been expected, and it is clear that operators are making the most determined effort in the history of the trade to maintain prevailing prices. But in spite of the restricted production, coal is accumulating on track at a number of points, instances of demurrage are frequently reported, and even the good grades are occasionally in the market at reduced prices. These cases are more the exception than the rule, producers being generally cautious about shipping except on specific orders.

The announcement of a receivership for one of the most powerful companies in the Pittsburgh district is evidence of the fact that better prices must be obtained for coal. While the advent of cold weather promises to create a more active demand in that section, the market is quiet and not particularly well maintained; operations continue on about a 60% basis, a large decrease from that previous to the closing of lake navigation.

A curtailment in iron and steel, and the decilne in general manufacturing demand have restricted operations in Ohio and price shading is now the rule all along the line.

The long continued warm weather also had a depressing effect on the market, while at the same time materially facilitating the movement. Lake shipments at Toledo for the season, now definitely closed, exceeded all previous records. Some surpluses are accumulating at the Hampton Roads piers but these are all well covered by contracts, and are only waiting tonnage to move them. A remarkable record was made by the Virginian Ry. in November, the movement exceeding that for the same month last year by over 100%.

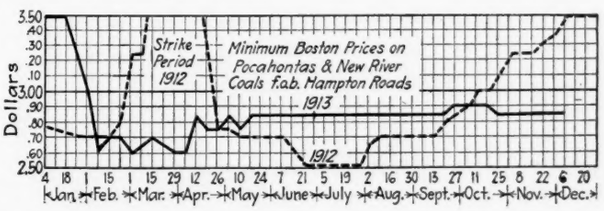
Business in St. Louis seems to have touched the bottom and has not experienced much change in the past week, but the Chicago markets showed a decided slump. Consumers are restricting orders on contracts often canceling entirely or specifying deferred delivery. Mining operations are being restrictel, and occasional congestions are reported in railroad yards.

EASTERN MARKET

BOSTON, MASS.

Bituminous market still inactive. Absence of inquiry for spot coal continues. Further decrease in offshore business, and government requisitions are fewer. Contract demand less insistent. Georges Creek continues strong and in uniformly fair supply. Pennsylvanias are weak. Anthracite strong but momentarily affected by the warm weather.

Bituminous—There is no appreciable change in the market which is still listless. At Hampton Roads, with the exception of the Norfolk & Western piers, there is still an accumulation of coal in excess of chartered tonnage. This, together with the dissappearance of free coal from New England waters, the light government requirements and the decrease in the offshore business should tend to soften the market here. The New England consumers' well stocked condition and the absence on their part of any fear of an immediate shortage of coal have made contract demand lighter. However the circular price for Pocahontas and New River continues firm at $2.85 f.o.b.



The Pennsylvanias are, of course, affected, as far as tidewater shipments are concerned, by the above mentioned superabundant supply of the Southern coals. All-rail Pennsylvania shipments exhibit diminution on account of weather conditions and the plentiful supply of water power. Prices on these coals range from $1 to $1.60 f.o.b. mines.

Georges Creek continues to move regularly on contract and the price for any surplus of this grade is rather more than firm.

Quotations are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New River
Mines*	$1.00@1.55	$1.25@1.60	$1.67@1.77	
Philadelphia*	2.25@2.75	2.50@2.85	2.92@3.02	
New York*	2.55@3.05	2.80@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.72@3.82
Providence†				3.72@3.87

*F.o.b. †On cars.

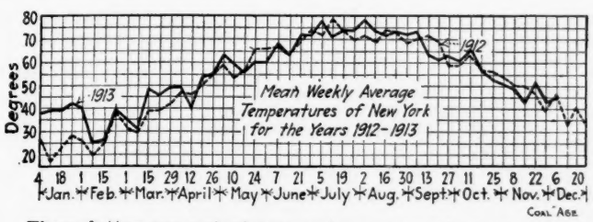
Anthracite—The postponement of the hoped for cold snap has caused a momentary quiescence of the market, the retailers having been unable to move but little of their stocks.

The marine freight market has undergone no material change. But few coastwise charters have been reported and shippers appear to be devoting their entire attention to providing for regularly chartered bottoms. Rates from Hampton Roads to Boston are 70 to 75c. per ton.

NEW YORK

Colder temperatures steadying up both anthracite and soft coal. Bituminous mining restricted, operators fearing to overship the market. Hard coal slow getting started, due to the backward season.

Bituminous—The New York market has been the last to feel the effect of the changed conditions in the soft-coal business, but the difference has been clearly apparent the current week in spite of the changed weather conditions. The slump is by no means of serious proportions, however, and the lower temperatures of this week will no doubt do much to steady things up. While lower prices are more frequently heard, this is, as usual, confined more particularly to certain tonnages threatened with demurrage.



These latter are not of any serious proportions; as a matter of fact it is remarkable what a small accumulation of coal there is at tidewater in view of the heavy shipments that have been coming down. Operators as a rule are cautious about shipping, except on specific orders, and as a result there is some slowing down of operations in the mining districts. It is clear that producers are making a more determined effort to hold prices than ever before in the history of the trade.

With the curtailed operations in the mining district, cars are now in plentiful supply, as is also labor. In view of the somewhat depressed conditions, we quote the New York market off 5c. all along the line from quotations for the past few weeks, as follows:

West Virginia steam, $2.60@2.75; fair grades of Pennsylvania, $2.70@2.80; good grades of Pennsylvania, $2.80@2.90; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

Anthracite—Conditions are rather quiet in hard coal, and supplies easy, in practically all sizes. Stove coal is as short as ever, but the situation is much easier, because the demand has dropped off; conditions are about the same on chestnut. Egg coal is in long supply and is the heaviest of any of the prepared sizes at the present time. Pea coal is active and in the best demand of any of the steam grades. As a rule, nearly all the upper port steam coals are difficult to move at the circular price, while the lower ports are flooded with the cheaper grade steam sizes. The line business continues the best feature in the anthracite trade.

As a rule business is slow in getting started this year, due to the unpropitious weather conditions, but the fall in temperature the first part of the current week will no doubt do much to relieve the situation in this respect. It is clear that stocks on hand are down to a minimum and the advent of real winter weather will create an active business immediately.

We now quote the New York market on the following basis, with prices usually steady:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	.....	$5.05	
Egg	5.25	$5.10@5.25	5.30	$4.75@5.20
Stove	5.25	5.25@5.50	5.30	5.20@5.45
Chestnut	5.50	5.50	5.55	5.40@5.45
Pea	3.50	3.50	3.50	3.35@3.45
Buckwheat	2.75	2.70@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25	1.95@2.20	1.80@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

BALTIMORE, MD.

Trade conditions are rather chaotic. Stoppage of call on contracts disturbs the market. Prices are weaker. Warm weather unfavorable.

That trade conditions in this section are unsettled is freely admitted. Considerable business is being done on contracts, and the export trade is gradually strengthening, but nevertheless there is a lack of new business apparent on all sides and the price list keeps softening. Curtailment of work by the steel and iron industry, the cement trade, and other lines of industry that touch the coal trade first is having a marked effect. A number of branches of business have stopped taking coal on contracts, while others that have relied on a certain amount of purchasing in the open market to supplement their contracts, seem to have dropped entirely out of the spot business for the time being.

In West Virginia prices are probably five to 10 cents off what they were a week or ten days ago. Low-grade steam coals were being offered in some mining districts at 80c. The gas market for run-of-mine is about on a par with this and three-quarter is quoted around 85 to 90 cents.

Pennsylvania line coals are selling uncertainly at prices ranging from 90c. to $1, and even the best grades are moving slow when offered as low as $1.30, mine basis. Many salesmen are being recalled from the road because new business is so poor as not to warrant the effort for the time being.

As outlined last week the hard-coal market is also unsatisfactory. Small yards are suffering most. There is plenty of coal on hand at local yards to meet the lightened demand.

PHILADELPHIA, PENN.

Changed weather conditions materially helped the hard coal business, and avoided the necessity of restricting production. Prices close to the circular and well maintained.

There has been a most welcome change in the situation in anthracite, in that the weather conditions, which have been anything but propitious, showed a change for the better. The week just past has done more to inject a little life into a situation which was rapidly approaching a mid summer condition, than anything that could have taken place. Dealers were becoming much discouraged, owing to the unseasonable temperature, and orders were slowly dwindling. This, of course, was effecting the operating companies, and it is safe to say that a week or two more would have meant curtailed mining, an unusual condition at this time of the year. October, November and December are generally looked forward to as being splendid coal distributing months, and the extension into the winter season of practically late Spring climatic conditions, has nearly upset the usual order of things.

As it is the anthracite market has held itself together in a remarkable manner. There has been no cessation of mining, and the output has, with few exceptions been taken care of. In fact, some of the companies were compelled to dip into their storage piles to supply the demand for certain sizes, notably pea and chestnut, but even these were getting easy at the close of last week. Rice coal seems to be about the only laggard, and the fact that bituminous is more easily obtainable, coupled with the fact that there is a slowly diminishing demand for rice coal in this market, doubtless explains this situation. The only satisfaction that the dealers have lies in the fact that, taking the years as a whole, there is always a certain amount of anthracite consumed, and what is left of December, together with January and February, will more than likely balance up the trade.

As to prices, the trade generally is now on about an equal basis. The general application of the state tax, either in the form of an additional price, or its equivalent, has put all operators on about the same basis, and trade that has been diverted into other channels owing to this difference, is likely to return. Anthracite prices rule as follows:

	Line and City Trade		
	Circular	Individual	Tidewater
Broken	$3.50	$3.60	$4.75@4.85
Egg	3.75	3.65	5.00
Stove	4.00	4.10@ 4.15	5.00@5.25
Chestnut	4.15	4.00@ 4.10	5.25
Pea	2.50	2.50	3.25
Buckwheat	1.50	1.50	2.25

The bituminous trade seems to continue along the lines of lower prices, and poor demand. New business is not easy to secure, and the output is being disposed of on old contracts. The inception of colder weather has not added the impetus to the bituminous market that was expected.

TORONTO, CAN.

Large stocks on hand and trade dull. New Pennsylvania state tax on anthracite added to retail prices.

Owing to the long period of unusually mild weather for this season, trade is rather quiet. Dealers have large stocks on hand in all lines, as since the close of navigation heavy shipments are being received by rail.

The increased freight rate of 5% on rail shipments via Suspension Bridge, which was announced to come into effect last month has been suspended until Mar. 12 next, and it is hoped that it may be further delayed.

The retail price of egg, stove and nut sizes of anthracite, has been advanced from $8@8.25 per ton, and pea coal from $6.50@6.75, the reason assigned being the increased price at the mines, owing to the imposition of the Pennsylvania state tax on coal. Quotations for bituminous are unchanged.

BUFFALO, N. Y.

Still a strictly weather market. Too much coal everywhere. Sellers trying to hold prices, but find that there are a good many cuts made. Anthracite lake shipments concluded.

Bituminous—There is no help for the bituminous-coal-market unless winter steps in and obliges consumers to buy. It is reported that large consumers, like the railroads, which commonly use a dozen or more cars a day at a single receiving point, are now taking only six or eight. This appears to be the rule with practically all concerns that are buying coal for heating purposes and even steam is made much easier than it would be if the weather was seasonable.

Meanwhile there is a steadily increasing accumulation of coal on track and the word "demurrage" that had scarcely been heard for a year, is again becoming common. It is a hard matter to get consumers interested in coal even where their jobber friends are trying to get tonnage off their hands. There are a good many strikes all through the bituminous fields but operators are rather inclined to welcome them, as the mines will not then turn out more coal than can be sold. The miners, on their part, are of the opinion that the producers are making too much money and are making all sorts of demands.

At present it is doubtful whether the summer prices can be held in any form much longer unless the recent cold snap steadies the market up. Jobbers report that they have given way, but operators deny this and say they are obtaining summer prices, at least after a fashion, and are of the opinion that former prices should continue. Quotations are at the moment weak on a basis of $2.90 for Pittsburgh lump, $2.89 for three-quarter, $2.65 for mine-run and $2.25 for slack, with slack rather firmer accordingly than sizes.

Coke—The coke market is not any stronger and promises to continue its former weak condition till there is a turn in the iron market. Dealers are finding a good many prices to contend with, as they seldom know whether the reductions are accompanied by corresponding cheapening of the product. Quotations remain weak on the basis of $4.70 for best Connellsville foundry, f.o.b. Buffalo.

Anthracite—The closing lake season finds that the anthracite shippers are not satisfied with the movement during the regular season, and are willing to pay extra insurance for December cargoes. During the first week in December they shipped 67,500 tons by lake and another cargo will bring to their credit a round 5,000,000 tons by lake from this port exceeding the previous record by more than a million tons.

The demand for anthracite is quite as slack as it is in the bituminous trade. There will also soon be as great a surplus, though it will be easy to store it for awhile yet, as lake vessels can be loaded. Retail dealers are much discouraged over the situation and outlook.

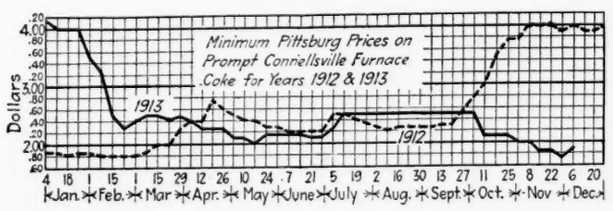
CENTRAL STATES

PITTSBURGH, PENN.

Receivership for prominent coal company. Market continues quiet with operations at the recently reduced rate of 60 per cent. Prices fairly well maintained. Coke slightly lower, but buyers and sellers still far apart.

Bituminous—The receivership of the Pittsburgh-Buffalo Co., secured Saturday, Dec. 6, by certain creditors, reflects in part some special losses which were incurred early in the year by flood, but also in large part the fact that it requires considerable gross profits per ton of coal mined to carry the large investments in plant and coal acreage demanded by present mining conditions. The company has expanded rapidly in the past few years and for several months past it has been known that it was relatively short of working capital. It is generally expected that the receivership will protect the properties and eventually restore the business intact to its owners. The move was precipitated by the fact that notes of the company were about to be offered at a discount. During the past year the operators of the Pittsburgh district have been endeavoring to secure better prices than formerly for their product, and the present involvement of the Pittsburgh-Buffalo Co. shows how well taken was the position that a larger margin was requisite.

The market has been quiet the past week and prices have



not been overly well sustained, though there has been no general cutting from the season list, to which the market lately declined from the premium prices put out in October. Manufacturing demand has remained relatively light, and so has domestic demand, but Sunday a near-blizzard visited the district and this week's domestic demand promises to be large. Operations continue on about the 60 per cent. basis estimated in last report, showing a large decrease from the rate before the lake season ended. We quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55; per ton at mine, Pittsburgh district.

Connellsville Coke—Prompt furnace coke has been available at lower figures, even $1.75 having been shaded in at least one instance. There is little demand as shipments on contracts are usually ample. Negotiations on contracts for the new year are proceeding slowly, and buyers and sellers are even farther apart than is frequently the case. The majority of sellers retain the idea that they should secure $2 on furnace coke contracts, but there are indications that they are nearing a conclusion to depart from this figure. Other sellers are quoting down to $1.85 and occasionally this figure is shaded, as it is reported that one contract was closed for 5000 tons a month over first half at $1.75, the seller being a furnace interest not intending to operate its furnace for some time. Foundry coke is in fair demand. We quote: Prompt furnace, $1.75; contract furnace, $1.85; prompt foundry, $2.50@2.75; contract foundry, $2.50@2.75, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 29 at 344,108 tons, a decrease of 11,132 tons, and shipments at 356,785 tons, a decrease of 22,119 tons. The "Courier" figures have shown a net excess of shipments over production for many weeks past, which is not easily explained.

COLUMBUS, OHIO

Further weakness characterized the local trade due to the continued warm weather in all sections. The coal market now dependant absolutely on the weather. Recent cold snap will keep the situation from complete demoralization.

Operators and shippers generally made an effort to maintain circular prices but were not successful. Shading was the rule all along the line, and a large tonnage could not be moved at any price. Bins of dealers all over the country are full and consequently low quotations fail to attract them. Cancellations of orders placed some time ago have been the rule and in many cases consigned coal was rerouted after shipment. There was considerable demurrage coal reported at centers such as Chicago, Toledo, Cleveland and Detroit and which still further weakened the market.

The car supply is now all that can be desired, the closing of the lakes causing a much better supply. Eastern Ohio reports about 90 per cent. and the Pomeroy Bend district about the same. In the strictly domestic fields the car supply has been adequate and the same is true of the Hocking Valley. Shutting down of a number of iron and steel concerns has had its influence on the steam business. There is a noticeable decline in demand from many factories. Railroads are not taking as much as formerly as the freight movement has slowed up appreciably.

A most successful lake season for Ohio operators has come to a close. Only a small tonnage was loaded during the past week and since insurance is off, no more cargoes will be loaded. The reports of the Hocking Valley docks at Toledo shows that 2,719,958 tons were loaded during the season as compared with 2,328,963 tons for 1912 and 2,253,069 tons in 1911. In Eastern Ohio the increase was even more marked. Many of the larger operators increased their tonnage from 70 to 85 per cent. over the previous year.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$2.00 @ 1.85	.....	$2.25 @ 2.15	$1.90 @ 1.75
3-4 inch	1.75 @ 1.70	$1.30 @ 1.20	2.00 @ 1.90	1.70 @ 1.60
Nut	1.30 @ 1.20	.....	1.75 @ 1.65	1.30 @ 1.25
Mine-run	1.35 @ 1.30	1.15 @ 1.10	1.50 @ 1.40	1.35 @ 1.25
Nut, pea and slack	0.85 @ 0.80	.....	0.95 @ 0.90	0.80 @ 0.75
Coarse slack	0.75 @ 0.70	0.95 @ 0.85	0.85 @ 0.80	0.70 @ 0.65

TOLEDO, OHIO

Long continued warm weather had a bad effect on the market. Circular well maintained despite slack demand. Movement good and cars plentiful.

Business in Toledo is quiet although the recent cold snap has had a beneficial effect. This section has rarely experienced such a steady run of warm weather at this season as has been the case this year. In some ways this has been a good thing as it has prevented congestion of railroad yards and given the roads a chance to get squared around following the rush of the sugar beet season. Cars are fairly plentiful now and most of the shipping troubles is due to yard congestion at some points and a lack of motive power rather than to a lack of equipment. However, there has been a car shortage reported until recently, railroads urging the hopper cars upon operators.

Despite the short demand prices have held fairly firm and are still being maintained very close to the list. While there are, of course, some sales below the circular, quotations have not broken nor show any indication of doing so. There is little coal left here on the docks as the amount shipped in seems to have been closely figured despite the extraordinarily heavy lake shipping this season. Steam coal is in fair demand.

Prices are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massillon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$2.00	$2.75	$2.25	$2.50	$1.50	$1.40
Egg	2.50	1.35	2.75	1.50	2.50	....	....
Nut	2.00	0.80	2.25	1.75	2.50	1.35	....
¾ lump	....	0.90	....	....	....	1.30	1.20
Mine-run	1.60	1.50	....	....	....	1.20	1.20
Slack	....	0.70	....	....	....	0.80	....

DETROIT, MICH.

Heavy shipments coming in and coal is occasionally reported on demurrage. Dealers canceling orders or requesting that shipments be deferred.. Prices slump in spite of determined efforts to maintain the circular.

Bituminous—All jobbers feel that they will need coal when the heavy weather appears but they are, at the present moment canceling all orders possible or asking operators to postpone deliveries indefinitely. A great deal of coal is coming in and there have been instances where demurrage has been paid for as high as seven and eight days. The others bought domestic coals heavily during the car stringency and these are now in poor demand. Car supply is excellent at the moment but there is a feeling that this may be of short

duration. Production in the Hocking and Pomeroy districts is about normal on both steam and domestic coal. Prices are shaded to move coal on demurrage and this has weakened the market all along the line, in spite of the strenuous efforts of the operators to maintain the circular. Hocking and Kanawaha domestic lump have both suffered a decline from their circular price of $2. Three-quarter lump which was quoted at $1.50@1.75 is now being offered at $1.15 while mine-run, which was held at $1.25 is down to $1 and slack is between 75 and 80c. per ton.

The following is approximately the market at the moment:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.50	....	$1.50	....	....	$2.50	$2.50
Egg.....	1.50	....	1.50	....	....	2.50	2.50
Nut.....	1.30	....	1.30	....	....	....	....
Steam lump....	1.20	....	1.20	....	....	....	....
3-in. lump.....	1.10	$1.15	1.00	$1.10	$1.10	....	....
Mine-run.....	1.00	1.00	1.00	1.10	1.10	....	....
Slack.....	0.76	0.85	0.65	0.75	0.75	....	....

Anthracite—Stove coal is short and is commanding a ready premium in this market. Other grades are coming in freely.

HAMPTON ROADS, VA.

Dumpings for the week fair. Coal shortage somewhat improved. Accumulation of coal at tidewater about normal.

The dumpings from tidewater piers for the week have hardly been as heavy as was expected. The movement both foreign and coastwise will be considerably behind the figures for the first week in December.

With a number of large government colliers due in the next few days, some shippers are accumulating coal at the different piers, and while there may appear to be a surplus at tidewater this is really not the case as the coal on hand is practically all contracted for and only waiting tonnage to move it. However, a few shippers have some free coal. Prices during the week have ranged from about $2.85@3, which is about the same as has been in effect for some weeks.

The Virginian Ry. ran a close race with the N. & W. for dumpings for the month of November, falling behind the latter road only about 5000 tons. At one time during the month the Virginian was considerably in the lead. The total dumpings of the Norfolk & Western were 345,727 tons, the Virginian 340,769, and the C. & O. at Newport News, 207,778 tons. The Virginian's dumpings is a record for that road, and is nearly one hundred per cent. over their November, 1912, figures. The N. & W. figures, however, are about 1500 tons behind their November, 1912, dumpings. The Norfolk & Western would have been considerably heavier had they not been hampered by having a large number of their coal cars tied up in the congestion on the various Western roads.

LOUISVILLE, KY.

Dullness prevails in both domestic and steam business. Mild temperatures up to the current week delayed consumption. Stocks heavy but prices are holding moderately firm.

The market is governed entirely by weather conditions which, up to the current week, were strongly adverse to an active trade. As the result, stocks are abnormally heavy and the volume of business is much below that customary at this period of the year.

An incipient car shortage is still being felt, eastern Kentucky mines having been idle for two days last week from this cause. However, this is of little consequence because of the flat market, but with the change in the weather conditions this week, the possibility of a continued shortage is regarded with anxiety. The light demand has effected a further decline in prices, but such declines do not represent the real market as operators appreciate the futility of attempting to force buying by abnormal cuts. Eastern Kentucky block of the better grades can be had at $2.15 a ton, as compared with the top price a few weeks ago of $2.50. Block and lump are rather slow at around $2, and round is worth $1.65@1.75. Better grades of nut and slack are offered at 75c.

SOUTHERN AND MIDDLEWESTERN

BIRMINGHAM, ALA.

Coal market quieter than for several months. Blacksmith coal normal. Furnace and foundry coke dull. Car supply still inadequate.

The market on steam coal is quiet, and some stock is accumulating on track, which is unusual for this season of the year. While business is slow, prices are remaining about stationary. Domestic coal is dull, due to the continued warm weather, and while the regular schedule on the higher grades is from $3 to $3.25 per ton, some interests are offering domestic lump as low as $2.75, while one interest has offered spot shipment at $2.50. This condition cannot last long, however, and all operators believe that the next few days will see a decided improvement in both steam and domestic business. The usual holiday rush orders have not yet come in, and, as the mines usually close down for several days during the holidays for lack of labor, operators are looking for a brisk demand for the balance of the year.

Blacksmith coal is moving in about its normal tonnage. Both furnace and foundry coke are quiet, though some tonnage of foundry coke is moving regularly Although some recent articles have stated that Birmingham iron is offered at $10 f.o.b. Birmingham, this is in error. While the market is very dull, and only a small tonnage being booked, the prices are from $11 to $11.50 per ton basis 2F f.o.b. Birmingham, the manufacturers believing that the price will go higher instead of lower. The car supply is still short of the requirements, especially on some of the large contracts, which require a heavy daily tonnage to move regularly.

NEW ORLEANS

Warm weather takes life out of city market. Texas orders fall off. Bunker trade shows decrease. Plan to bring Alabama coal by water proves failure for present.

A stagnant conditions of the city coal market has resulted from the continued warm weather and is responsible to a great extent for the unusually large stocks being carried at this time of the year. Demand from other sources has been light during the past week. Bunker business has been slow while the demand from western Louisiana and eastern Texas is falling off. The only activity in the week's business was the filling of several orders for Latin America.

The local market is being affected adversely by the increased practice of European-bound ships to take only a portion of their coal supply here. By taking aboard a supply sufficient to reach Norfolk, considerable additional cargo space is provided. This is more than offset, however, by the increasing number of direct sailings to South and Central American ports.

So far as the first barge load of coal from the Alabama field is concerned, the experiment is an abject failure. The cause, however, does not reflect on the fundamental ideas of the plan. Failure on the part of the government to complete the locks at the time specified, makes the navigation of the Warrior and Tombigbee Rivers practically impossible for a loaded barge. A year at least must elapse before the locks are completed during which time the expensive handling machinery must remain idle.

CHICAGO

Marked slump in the Chicago trade, due to continuation of warm weather and a recession in general business conditions. Shipments are curtailed and operators are reducing their output. Many orders are being canceled and requests for delayed shipments are frequent. Demand for anthracite is small. Coke market dull.

Continued warm weather up to the present week, and a general slackening in business conditions has produced a decided slump in the Chicago market. Dealers complain that sales of domestic coal have fallen off in a marked degree and in the steam-coal trade there has been a substantial decline in the volume of orders.

Market observers declare that a sharp recession in production is necessary to prevent a general slump in prices. The storage capacity of a majority of the retail dealers is taxed to the limit and many of them have ordered more coal than they have room for. Many canceled orders and requests to delay shipments have been reported. Some operators who sold coal at $2 or better have had all unshipped orders canceled within a few days.

There is comparatively little demand for anthracite coal and a number of all-rail shipments are now subject to demurrage charges. No changes in the price list have been noted, but sales are light. The price of smokeless mine-run is being held at $1.40 by the larger producers, who are cutting down shipments as much as possible. A small amount of off-grade fuel is being moved, but practically no free coal is reaching the Chicago market. Some of the large smokeless buyers are making an attempt to drive the price of mine-run to $1.25, but so far their efforts have not been successful.

Shipments of Hocking coal are also being curtailed. Smaller shippers have been forcing sales at sacrifice prices, in some instances as low as $1.50, the mines. Operators in the Springfield district are handling steam coal on contracts chiefly, and devote little attention to domestic business at present. Prices for domestic lump range between $1.35 and $1.50, Indiana domestic sizes vary between $1.40 and $1.50. There has been a slight improvement in screenings, but the

volume of business is far from satisfactory. Carterville operators have been reducing their shipments and lump and egg sales range from $1.50 to $1.75, the mines. Franklin County lump and egg are down in price to between $1.50 and $1.75. The coke market is soft.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.17@2.32	$2.55@2.80	$2.12@2.27	
Steam lump	1.92		1.97	
Egg		2.55@2.80		$4.20
Mine-run	1.87	2.40	1.87	3.45
Screenings	1.12	1.70	1.27	

Harrisburg—Domestic lump and egg, $2.55@2.30; steam lump and mine-run, $2.25; screenings, $1.55; No. 1 nut, $2.55@2.80; No. 2 nut, $2.55.

Carterville—Lump, egg and No. 1 washed, $2.55@2.80; No. 2 washed, $2.55.

Coke—Connellsville, $5.25@5.50; Wise County, $5@5.25; byproduct, egg, stove and nut, $4.90@5; gas house, $4.75@4.95.

ST. LOUIS, MO.

Market unchanged but more seasonable weather conditions will have a beneficial effect. Demand satisfied at the moment and some mines closing down. Large accumulations of coal.

Continued warm weather has brought about no change in the market. However, this week started off inclined to be more favorable to the coal trade, and from now the situation should improve. Conditions are much the same as reported last week, with the exception that what little demand there was at that time has long since been taken care of and several operators found it more economical to shut down than to continue producing.

Retail yards are still piled up with storage coal, and railroad yards at all diverting points are loaded to capacity with unbilled coal. The screenings market started the latter part of last week to get into its own again, those in the Standard field advancing as much as 10c. in one day. They are still bringing better prices and this condition will likely continue now for some time.

There seems to be plenty of cars on the big coal carrying roads, but the Southern and the M. & O. are in bad shape and the Wabash is about the same. There is no coke market, no demand for anthracite, and no inquiry at all for smokeless.

The prevailing prices are:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	$1.00*
3-in. lump	.....	.....	$1.40*	.....
6-in. lump	$1.30 @ 1.50	.....	1.50*	1.20*
Lump and egg	1.85 @ 2.15	.....	.....	.....
No. 1 nut	1.40 @ 1.60	.....	.....	.....
Screenings	0.40 @ 0.50	.....	.....	.....
Mine-run	1.10 @ 1.20	.....	.....	.....
No. 1 washed nut	1.75	$2.25	1.40	.....
No. 2 washed nut	1.35	.....	1.60	.....
No. 3 washed nut	1.15	.....	.....	.....
No. 4 washed nut	1.05	.....	.....	.....
No. 5 washed nut	0.50	.....	.....	.....

* Asking price.

INDIANAPOLIS, IND.

Teamsters' strike has cut off domestic deliveries. Mild weather reduced running schedule of mines about one-third. Plenty of cars. Isolated cases of price shading, but general tone firm.

Mild weather and the teamsters' strike in this city continue to be the chief influences in the coal industry. The strike had little effect on the factory consumption, but it stopped the delivery of coal to domestic users. The net results during the disorder were about one dozen killed and wounded, and as much excitement centered around efforts to deliver coal as in all other lines combined. The disorder would have been much worse had not the police been well organized and had the assistance of about 3000 special police made up largely of employers and loyal employees. No rioting lasted more than long enough to give the police time to reach the scene in speeding autos. Only two or three dealers attempted deliveries, and these were few. The general policy of employers was to stop business, awaiting the end of the trouble. The strike was declared in effect Sunday midnight. There had been a great rush of deliveries in anticipation, the bustle extending through Sunday up to the hour for striking.

The mild weather is a depressing influence throughout the state and has cut down the running time at the mines about one-third. There are plenty of cars, now that they are not badly needed. Reports are heard of cut prices here and there, but the operators in general hold firm. There is little use in lowering prices, they say, when consumers have their bins full. The standard price for screenings is 60@65c., mine-run $1.25@1.35; steam lump, $1.45@1.55; domestic lump, $1.90@2. Retail prices in this city hold at the basis of Sept. 20, when the winter rates went into effect.

The average temperature recorded in the Indianapolis bureau for November was 47.6 deg., and this was a fair index of the weather generally over the state.

KANSAS CITY, MO.

Operations being restricted due to warm weather. Market remains steady though dull. Colorado strike not affecting the local situation.

Rain and warm weather have failed to form a favorable combination in Kansas and Missouri and business has been at a low ebb during the past week. Most of the operators are working on part-time basis, being unable to keep their plants in continuous operation under present conditions.

The market has been steady in most cases, despite the lull. The Denver situation is having no bearing on conditions in Kansas City. Reports from Denver recently were to the effect that a shortage in coal is prevailing there. However, there is plenty of coal being mined in Colorado, and there is little or no probability of Kansas coal being shipped into Denver or other Colorado points as a result of the strike. The only possible result is a heavier shipping to western Kansas, should the Denver disagreement be prolonged.

OGDEN, UTAH

Only colder weather will bring renewed activity to the coal market. Surplus of nut at mines causes drop in quotations. Car supply sufficient to handle present shipments. Strike situation in Colorado not improved.

All the mines in Wyoming and Utah have been keeping up on their shipments and making efforts to stimulate the market. Mild weather continues throughout the territory and coal is moving slowly. Many standing orders have been reduced or canceled. This light demand for coal has caused a surplus of nut at the mines and there seems to be no market for this grade. Nut is a summer coal and there is little call for anything except lump at this time of the year.

A few salesmen still believe that a cut price will move a surplus of coal on the stagnent market and consequently this grade has been offered below quotations. This method might bring temporary relief in some cases with other grades of coal, but nut coal is sold entirely to retail dealers who buy a car at a time and only when they have sufficient orders in sight to handle same. The cut price may induce the dealer to order a few days before he intended to, but it does not increase the sale of this grade.

The ideal fall weather has allowed the railroads to handle coal shipments in record time, which has been one item effecting the car supply. Cars are plentiful and there is no indication of a shortage.

Shipments to Nebraska and Colorado from the Wyoming mines continues slightly above normal, except for nut coal.

Quotations remain unchanged as follows:

	California	Colo. & Neb.	General
Lump	$3.00@3.50	$3.25	$2.75
Nut	2.50@3.00	2.50	2.25
Mine-run	1.85	1.85	1.85
Slack	1.00	1.00	1.00

PORTLAND, ORE.

Report that railroads may take advantage of reduction in duty on foreign coal by purchasing from mines in Canada. Strike there has reduced output and considerable coal has been shipped from this side into British Columbia.

It was reported here this week that railroads in this part of the country have been investigating the possibilities of importing coal from British Columbia. It is understood that instead of quoting the price, minus the 40c. per ton duty, the miners were not inclined to make more than a 30c. reduction. It has been impossible to verify the report at this time.

It was recently announced that the Boston Pacific line will inaugurate regular fortnightly steamship service between Boston and ports on the Pacific Coast, including Portland, as soon as the Panama Canal is thrown open for commercial traffic; and in this connection it has also been announced in a private telegram, on what appears good authority, that the canal will be open and ready for business in April or May of next year, about ten months earlier than former reports have indicated. To begin with eight steamers, representing a total carrying capacity of 50,000 tons, will be placed in commission, two of them now being built at Boston, each of 9000 tons carrying capacity.

The coal market here at present is without change, as to prices, but as the winter advances the demand for domestic purposes is becoming keener. So far the weather has been against heavy consumption throughout the Pacific Northwest.

FINANCIAL DEPARTMENT

St. Louis, Rocky Mountain & Pacific Co.

Under date of Aug. 1 Pres. J. Van Houten sent out a circular which we abstract as follows:

Agreement to Sell Railway Property to Atchison Topeka & Santa Fé

The mortgage securing your bonds is a first and direct lien upon all of our coal properties, coal mines, mining and coking plants, which constitute the principal security for your bonds (and will so remain), and is also a lien upon the stock and bonds issued by the St. Louis Rocky Mountain & Pacific Ry. Since the execution of the mortgage, the company has purchased further coal land and rights, has opened and equipped four additional mining plants (making five in all) and one new coking plant (making a total of two), all of which new property has come under the lien of the mortgage. These additions and improvements have increased our capacity from about 1500 tons daily in 1905 to from 7000 to 8000 tons, and a present actual daily coal production of 5000 to 6000 tons.

The railway has 106 miles of main line of standard gage, well built and maintained, with 523 freight cars, 2 passenger cars 2 combined passenger, express and baggage cars and 7 locomotives. It does not enter directly any of the markets for the company's fuel, except local points of small importance, and the divisions of through rates which it has been able to obtain are so small, owing to the short haul, that it has not been a paying proposition. In fact, there has been a considerable and increasing annual deficit which has had to be provided for out of earnings from the coal business. Under the present laws, discrimination, either as to rates or service, is practically impossible; hence, the control of the railway by this company gives no advantage which we would not otherwise enjoy. Moreover, we actually suffer a disadvantage in times of car shortage on account of the limited equipment of the railway.

Heretofore, notwithstanding the large annual deficit of the railway, which during the past six years has caused a loss to the company in interest on the railway company's bonds and in money advanced for operating expenses amounting to $900,000, this company has been able not only to provide for this deficit and meet its own expenses, taxes and fixed charges promptly, but has also accumulated a substantial surplus from earnings of the coal business the greater part of which has been reinvested in the extension and improvement of the coal properties.

After a careful consideration, the directors have decided that the company should go out of the railroad business and devote all its resources to the enlargement of its fuel business. The company accordingly has negotiated an agreement whereby the railway stock and bonds or the railway property may, upon release of said stock and bonds from said lien, with the consent of bondholders, or, if necessary, through foreclosure of the mortgage upon the railway, be disposed of to the Atchison Topeka & Santa Fé Ry. Co. for the consideration mentioned in the inclosed agreement. Such disposition will bring four decided advantages for this company's bondholders: (1) A valuable asset readily convertible into cash and bearing a regular return in place of the nonproductive stock and bonds disposed of. (2) The assurance of ample transportation facilities at all times and the active coöperation of a great railway in the promotion and extension of our fuel business. (3) Freedom from embarrassment in the future should Governmental legislation compel the disposal of the railway without possibly giving adequate opportunity to make favorable terms. (4) The proceeds of the property to be disposed of will be used for your benefit either by retiring a large amount of the company's outstanding bonds, or else the securities received as part of such proceeds will be held by the trustee subject to the lien of your mortgage.

Present Mortgage to Be Closed Except as to $1,000,000 Available for Future Coal Developments, Etc.

Under this company's present mortgage, additional bonds amounting to $6,301,000, par value, are authorized and may be issued for railway purposes. It is proposed so to amend the mortgage that upon the disposal of said railway stock and bonds or of said railway, the authority to issue such additional bonds will terminate. The mortgage securing your bonds will thereupon become substantially a closed mortgage, as no further bonds could be issued thereunder, except not to exceed $1,000,000 for developing and improving the coal property.

Sinking Fund to Be Inc'd from 1c. to 3c. a Ton, to Retire Bonds by Maturity

The company proposes also to increase its sinking fund payments to 3c. per ton of coal mined each year instead of 1c. per ton as now. Considering the constantly increasing business and that a large amount of outstanding bonds will be retired as a result of the disposal of the railway property, it is believed that the proposed annual payment of 3c. per ton will be adequate to retire the entire bonded debt at or before maturity.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends announced during the week ending Dec. 6.

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	83	83	8 3	87	80
American Coal Products Pref	..	..	105	109½	102
Colorado Fuel & Iron	28¾	27¼	28	41½	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102½	102½	102½
Lehigh Valley Coal Sales	190	175	175	....	....
Island Creek Coal Com	47	45½	47	53½	47
Island Creek Coal Pref	83	81½	83	85	80
Pittsburgh Coal	19½	18⅝	19½	24⅜	14½
Pittsburgh Coal Pref	88½	87½	87½	95	73
Pond Creek	18	17⅛	18	23⅜	16½
Reading	163¾	159⅝	162¼	171	151¾
Reading 1st Pref	84½	84	84½	92½	82½
Reading 2nd Pref	87	86	87	95	84
Virginia Iron, Coal & Coke	..	..	40	54	37

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	90	93	91½	91½	90	99½
Colo. F. & I. gen. 6s	102	106½	107½	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	75	78	77½	Nov. '13	77½	85
Cons. Ind. Coal Me. 1st 5s	76	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	86½	92	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅜	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s	..	87⅜	86	Oct. '13	85	87⅜
St. L. Rky. Mt. & Pac. 1st 5s	76	Sale	76	76	73	80½
Tenn. Coal gen. 5s	97½	97¾	97½	97½	97	103
Birm. Div. 1st consol. 6s	101½	101½	101	Nov. '13	100⅜	103
Tenn. Div. 1st g 6s	101⅛	101½	100⅞	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	..	..	..
Victor Fuel 1st s f 5s	..	84	80	May '13	79½	80
Va. I. Coal & Coke 1st g 5s	92½	93	92½	Nov. '13	92	98

No Important Dividends were announced during the week.

Canadian Coal & Coke Co.—It is stated that this company will shortly issue two-year notes, to the amount of $750,000, and it is further stated that the American bankers interested in the financing, will advance an additional $500,000.

FOREIGN MARKETS

GREAT BRITAIN

Nov. 28—Strong conditions continue to rule. The demand for all classes of coal is good, and collieries are heavily booked for December.

Best Welsh steam	$4.92@5.04	Best Monmouthshires	$4.20@4.32
Best seconds	4.68@4.87	Seconds	3.96@4.08
Seconds	4.50@4.62	Best Cardiff smalls	2.58@2.70
Best dry coals	4.56@4.80	Seconds	2.40@2.52

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.